Reading Architects' Blueprints

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READING ARCHITECTS' BLUEPRINTS
Parts 1–3

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READING ARCHITECTS' BLUEPRINTS

(PART 1)

1842A Edition 1

DRAWINGS, BLUEPRINTS, AND SPECIFICATIONS

INTRODUCTION

1. Definition of a Drawing.—A *drawing* is a series of lines, marks, symbols, letters, and figures, made on paper or cloth for the purpose of showing the design, arrangement of parts, and size of a building or any object. In the case of a building, several drawings are required to represent it completely.

2. Definition of a Blueprint.—A *blueprint* is a print made upon sensitized paper from a drawing that has been made on transparent paper or cloth. A sheet of paper coated with a substance sensitive to light is placed against the paper or cloth upon which the drawing has been made, in a suitable frame under a sheet of glass. Sunlight or strong artificial light is then allowed to act upon the sensitized paper through the drawing. When the sensitized paper has been exposed for a sufficient time, it is removed from the frame and thoroughly washed in clear water. The parts covered by the opaque lines of the drawing become white, and the remaining parts become blue.

3. Object of Making Blueprints.—Drawings must be made by the architect or his draftsmen, and considerable time is required to produce them. They are, therefore, comparatively expensive. It is advantageous to have several copies of the drawings that are made for any building, so that estimators, contractors, foremen, and others may have separate copies. Consequently, the original drawings are traced upon transparent paper or cloth. These drawings are called *tracings,* and any number of prints can be made from them without injuring the tracings. The tracings are generally filed in suitable cases or drawers in the architect's office, and prints can be made from them at any time. The process of making blueprints is inexpensive when compared with that of making drawings or tracings. Every mark shown on the tracings is faithfully reproduced on the blueprint, and for this reason the use of the blueprint accomplishes the same result as if the original drawings were used.

4. Importance of an Understanding of Drawings. The drawings and blueprints made by the architect must be used by the contractors, the foremen, and the dealers who supply the materials employed in the construction of the building. Hence it is important that such persons should thoroughly understand the drawings and be able to interpret all lines, marks, symbols, and letters found on them.

5. The contractor or the estimator employed by the contractor, must thoroughly understand the drawings, as it is his function mentally to resolve the building into its component parts, and to make complete and exact lists of all the materials that are required for its construction.

6. The foreman represents the contractor at the building, and has charge of its erection. He must be competent to take all the materials delivered at the building site and put them together according to the drawings. Any mistakes that he may make in interpreting the drawings may prove very costly to the contractor, who must pay the cost of correcting them.

7. A dealer who supplies cut stone, brick, lumber, hardware or other materials for a building is often called upon to make estimates for furnishing such material. To do this intelligently he must be able to determine from the drawings just where and in what quantities his materials are to be used, and this requires ability to read the drawings.

8. The indications used on architects' drawings are really a special language used to convey facts and ideas necessary for the construction of a building, and they should be thoroughly understood by all those that supervise and direct such work.

9. Definition of a Specification.—A *specification* is a detailed description of the character and quality of the workmanship and materials that are to be used in a building. The collection of all the specifications for any one building is known as the *specifications,* or *set of specifications.* The specifications include information that cannot be shown graphically on the drawings.

10. Relation Between Drawings and Specifications.—It is evident that many of the architect's ideas, as for instance, those in connection with painting and decoration, hardware, plaster work, the finish of woodwork, qualities of materials, and methods of operation, cannot be shown on the drawings. Consequently, the specifications are a necessary supplement to the drawings, and the drawings and specifications should, taken together, furnish all the information requisite for the erection and completion of the building. Incompleteness in the drawings and specifications gives rise to most of the disagreements and misunderstandings that occur between the owner and the contractor, and between the architect and the owner.

11. Some architects make many notations on drawings which belong more properly in the specifications. When such notations are put on drawings the contractor is apt to be misled by them. Thus, "oak flooring" might be marked on the drawings, whereas the specifications might call for "quarter-sawed white-oak flooring." Unless the contractor compares the two

notations carefully, a mistake is apt to to be made in the materials ordered or furnished. Complete descriptions belong in the specifications, and it is not wise to write partial specifications on the drawings.

DRAWINGS USED TO REPRESENT BUILDINGS

12. The drawings generally used to represent buildings are *elevations, plans, sections, scale details,* and *full-size details.* For very small and simple buildings, the elevations, plans, and sections are often sufficient for estimating the cost of materials and for erecting the building. In more elaborate structures, elevations, plans, and sections are given to the contractor for use in estimating the cost of the building, and scale details and full-size details are given, in addition, to assist him in erecting the building. The contractor frequently prepares special drawings, known as *shop drawings,* which he uses in preparing and erecting his particular work.

Accompanying this Section is a set of blueprints of a moderate-sized residence. This consists of four elevations, four floor plans, and two sections. On these prints will be found examples of the practical application of many of the details that are shown in the illustrations accompanying the descriptions here given.

A clear understanding of how the different indications mentioned in the text will appear on working drawings can be obtained by referring to the place on the blueprints where the object, material, or construction mentioned appears.

13. Elevations.—Elevations are drawings that show the exterior of a building in its true proportions, but usually at a smaller size. The drawing of the front of a building is called the *front elevation;* that of the side that is on the right of a person facing the front of the building is called the *right-side elevation;* that on the left is called the *left-side elevation,* and the drawing of the rear is called the *rear elevation.*

According to whether these elevations are to be toward the north, east, south, or west, they are sometimes marked *north elevation, east elevation,* etc. The north elevation is the north-

erly side of the building, etc. The elevations accompanying this Section are marked North, East, South and West, respectively.

The purpose of the elevations is to show the appearance of the exterior of the finished building, and on them are usually found various indications of materials used for constructing the exterior of the building, indications of floor lines and levels, dimensions, such as story heights and sizes of the sash.

14. Plans.—The terms *plans, set of plans, working drawings, general drawings,* etc., are frequently used to refer to all the drawings that are prepared for the construction of the building. When used in this sense, these terms refer to and include all the floor plans, elevations, sections, and often the details of the building.

Strictly speaking, however, a plan is a horizontal section through the building, showing the arrangement of the parts of one floor, and is often called a *floor plan.* These plans are drawn in their true proportions and of small size, such, for example, as $\frac{1}{4}$ inch = 1 foot. A plan is generally made of each floor, and each plan is named from the floor that it shows. Thus, the plan of the first floor is designated the *First Floor Plan;* of the basement, the *Basement Plan;* of the attic, the *Attic Plan.* Separate plans are sometimes made for the foundation and for the roof, but more generally the lines of the foundation are shown on the basement plan, while the lines of the roof are shown on the attic plan. Plans of the basement, first floor, second floor, and third floor, or attic, accompany this Section.

15. Floor plans show the arrangement and location of walls, partitions, closets, dressers, fireplaces, windows, doors, and other parts of the building, as well as indications of the materials of which certain parts are constructed. They also show the location of various devices, such as plumbing fixtures, lighting outlets, and heating apparatus. Such devices are shown in approximate location only, and the specifications describe them in character and detail. Their exact location will be fixed after the building is erected and the walls and partitions are in place.

16. In some cases the architect indicates the location of such equipment as gas stoves, ranges, laundry stoves, hot-water

heaters, refrigerators, bookcases, and other furniture not necessarily attached to or built into the building, in order to show where they may be placed, or to indicate to the contractor where connections are to be made. When such furniture or equipment is shown on the plans, it should be particularly stated either on

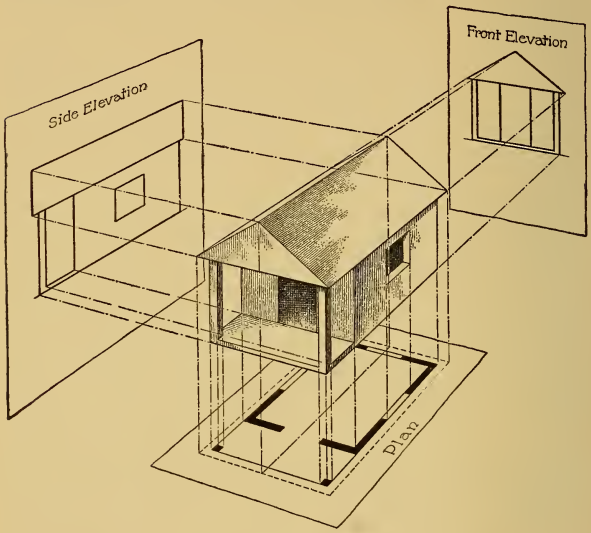


FIG. 1

the plans or in the specifications whether or not such fixtures are to be furnished, and by whom.

17. Relation of Plans to Elevations.—It is impossible to show all of a building properly either on plans alone or on elevations alone. It is, therefore, necessary to have both plans and elevations. Further, it is impossible to show all of the design on one elevation, it being necessary to show an elevation of each side of the building. This fact is illustrated in Fig. 1, which represents a small building. It is evident that while the plan shows the actual area covered, it indicates very little of the

design shown on the elevations. As the front elevation gives very little indication of what appears on the sides, it is necessary to have a plan and also elevations of all the sides of the building in order that all of the design may be shown. The plan, shown in Fig. 1, gives no indication of the height of the building, but the height is plainly seen on the elevations. On the other hand, the depth of a house, or the distance from front to back, cannot be determined from the front elevation alone, although from the plan an exact idea may be obtained. Likewise, the side elevation gives no indication of the width of the building, but this is clearly shown on the plan and on the front elevation. Elevations show the building without regard to the distance of any of the parts from the eye, and one is unable to determine from them how far back any part may be. Thus, in the front elevation, the door is the depth of the porch back from the front of the porch, but this distance is not indicated on the front elevation. It shows plainly, however, on the plan and on the side elevation. From this example will be seen the necessity for the plans and the several elevations.

18. Dimensions.—Every floor plan should be carefully dimensioned, as the principal dimensions of the building occur on such plans. Dimensions are especially important on the cellar or basement plan, since the accurate construction of the upper part of the building depends largely upon the care with which the cellar walls are laid out. The total lengths of the walls of the building should be given, particularly on the basement plan. How such dimensions are placed will be seen by reference to the accompanying blueprint entitled Basement Plan. There the overall length of the front wall of the main building is shown to be 44′ 0″ (44 feet 0 inches); the depth of the building, as shown on the right-hand side of the plan, is 43′ 0″, and the length of the rear extension wall is 29′ 6″.

These total, or overall, dimensions on the basement plan are of the greatest value in laying out the lines for excavating for the foundation walls. In the upper floors they are useful in estimating quantities of materials used in various parts of the work.

These overall dimensions are divided into smaller dimensions, as shown on the blueprints, such as those from the ends of walls to centers of windows, pilasters, etc. In the case of walls built of masonry, the dimensions are taken from the finished outside face of the wall. In the case of frame buildings, the dimensions are generally taken from the outside of the sheathing, if sheathing is used. In some cases, however, the dimensions are taken from the outside faces of the studs. The methods of dimensioning plans will be further discussed in connection with plans of buildings given later on.

Dimensions should also be given for the interior of the building, the dimensions being taken to the centers of partitions and to the outside of masonry walls, or to the face of the studding of frame walls, as illustrated in the blueprint entitled Second Floor Plan. The height of stories, windows, and other vertical heights are shown in the elevations and sections, and are given with relation to the finished floor lines or to the top lines of the floor joists.

In marking the locations of windows, doors, and other openings on the plans of frame buildings it is customary to give the dimensions to the centers of the openings. On plans of masonry buildings it is usual to give the dimensions to the sides of the openings rather than to the centers. Thus, with brick walls, the dimensions show not only the length of the walls between the windows, but the actual brick openings for the windows and doors. Careful study should be given to the methods of dimensioning used upon the accompanying blueprints.

19. Hidden Construction.—There are many places on drawings where work is indicated, although actually it would not be seen. This is for the assistance of the workmen and others who wish to see the relation between the work actually shown on the drawings and other parts related to it, but which ordinarily would not be shown on the drawing. Thus, in the blueprint entitled South Elevation are indicated the locations of the footings for the foundation walls at *a*, the bottoms of the dwarf walls for porches and areas at *b*, and the basement sash below grade at *c*. These lines, indicating work not in

plain view, are shown dotted or broken. In this elevation are also shown the finished floor lines *d*, indicated by dot-and-dash lines, extending out to a line of dimensions showing the distances from floor to floor. In the Basement Plan at each side of the wall *a* are seen the broken lines indicating the footings for the walls, and at *b* is shown a concrete pier below the floor line.

In the First Floor Plan at *a* is shown an opening containing two columns and dotted lines extending across the opening. The dotted lines represent the work above the plane at which the remainder of the plan is taken, and indicate that the partition is carried across the tops of the columns. While these features may be shown in other drawings, their indication at these places shows their relation to the other parts of the building. The labor of drawing a complete additional plan or section is thereby obviated and the workman is saved the trouble of comparing a number of drawings to get the necessary information.

20. Framing Plans.—While the architect prepares the general plans to show the arrangement of rooms, walls, windows, doors, and other parts of the building, he must also provide for the construction to be used. The framing construction is seldom shown on the general plans, yet the architect must carefully consider that work. In other words, there is an implied construction which must be considered in the preparation of all plans. Thus, a frame building must have joists, studs, rafters, framing for stairs, doors and windows, etc. Although this work may not be actually shown, the architect must provide room for its installation. In like manner, the piping for plumbing and heating, wires for lighting, etc., must be provided for in the planning of the building, although none of it may show on the general plans.

A wall consisting of studs, stucco, and plaster, as at *b* in the First Floor Plan, is represented by inside and outside lines only, as the construction is generally specified. These lines, however, must be drawn the proper distances apart to provide for the construction required by the architect.

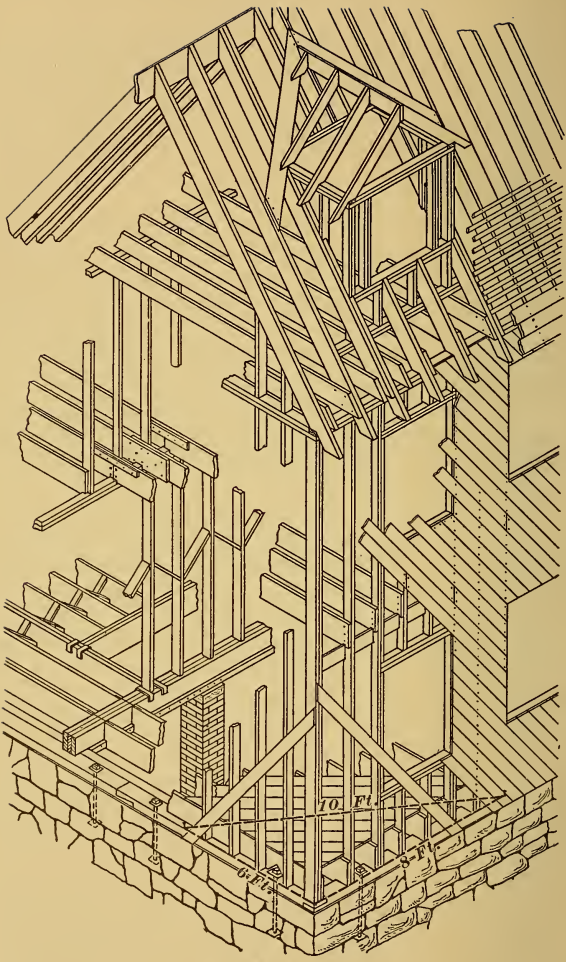


Fig. 2

21. It was formerly the practice for the architect to make a framing plan of each floor and the roof, as well as a framing elevation for each of the outside walls. These drawings showed accurately the arrangement of studs in the wall and the framing around the doors and windows. The drawings also gave the arrangement of floor joists, framing of stair wells, around chimneys, etc. These drawings taken together were generally known as *framing plans.* This practice is not generally followed now, as the methods of installing or erecting the framing are according to established customs or methods. Instead of the architect preparing such drawings, the contractor or his foreman is usually expected to lay out whatever framing plans he may require. As shown on the blueprints, the architect usually indicates the direction of the joists in the floor by arrows; also the size and spacing of the joists.

In Fig. 2 is a perspective diagram of the framing of a building similar to the one shown in the blueprints; in this diagram can be seen the construction that is not shown, but is implied, in the general plans.

22. Sections.—Sections are drawings that show how a building would appear if it were cut vertically from roof to cellar by a huge knife or saw, and the interior of either part were shown. A section that is taken in a direction parallel to the front of the building is sometimes called a *transverse section.* A section taken perpendicular to the front of the building is sometimes called a *longitudinal section.* In other cases, the section taken in the direction of the greatest length of the building is marked the longitudinal section, and the section taken at right angles to the longitudinal section is called the transverse section. Sections are not always taken in one plane, but are often taken along a line marked on the floor plans with letters, as *A-B* or *C-D* in the blueprints of the plans. The object of doing this is to show the most important parts of the building in one section, and to avoid making any more sections than are absolutely required. Thus, the transverse section shown in the blueprint is taken on the line *A-B* in the floor plans. This section shows a view of those portions of the building which

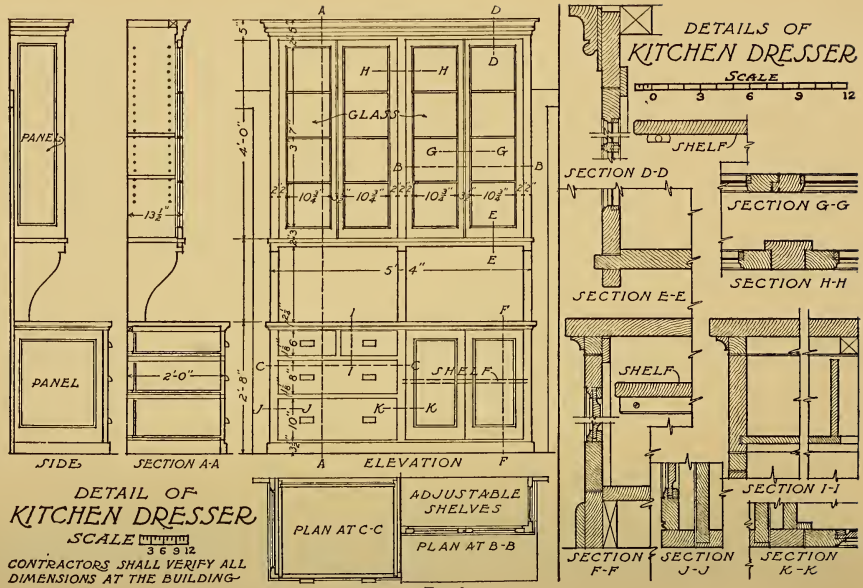
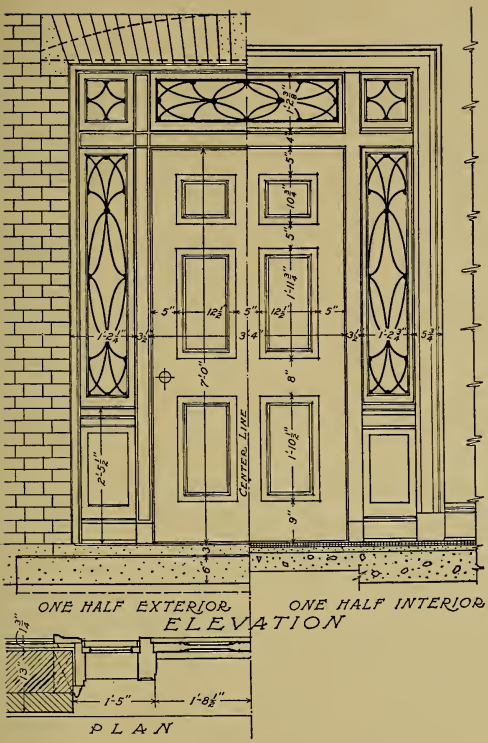

DETAILS OF
KITCHEN DRESSER
SCALE
0 3 6 9 12
SHELF
SECTION D-D
SECTION G-G
SECTION H-H
SECTION E-E
SHELF
SECTION I-I
SECTION F-F
SECTION J-J
SECTION K-K
PANEL
13½"
SIDE
SECTION A-A
A
D
H
H
D
GLASS
G
G
B
B
E
E
5"
4"
F
F
C
C
SHELF
J
K
K
4'-0"
2'-8"
2'-0"
PANEL
A
ELEVATION
F
DETAIL OF
KITCHEN DRESSER
SCALE
3 6 9 12
CONTRACTORS SHALL VERIFY ALL
DIMENSIONS AT THE BUILDING
PLAN AT C-C
ADJUSTABLE
SHELVES
PLAN AT B-B

FIG. 3



ENTRANCE · DOORWAY
IN BRICK WALL

FIG. 4

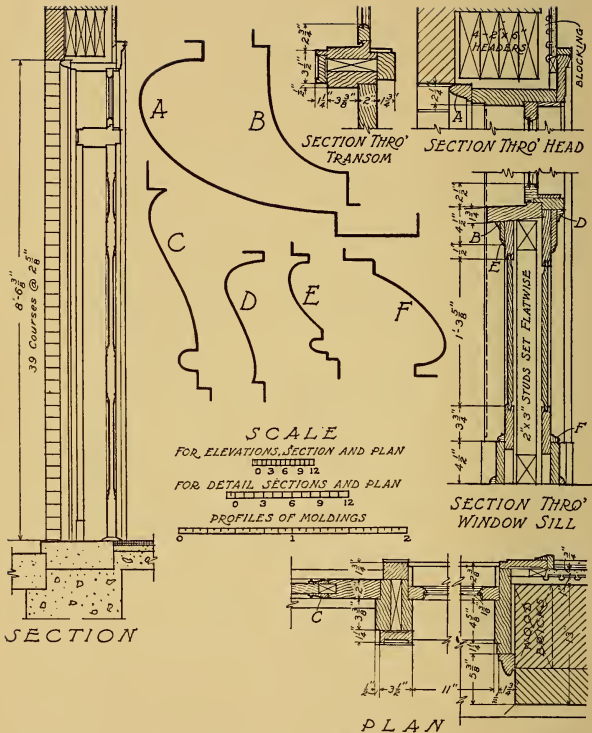


FIG. 4—(*Continued*)

would be seen by a person looking in the direction of the arrow points at *A* and *B*, if the portions in front of the section line were removed. Likewise, the blueprint of the longitudinal section shows a section of the building taken on the line *C-D*, and showing those portions of the building seen by a person looking in the direction of the arrow points at *C* and *D*.

23. Scale Details.—While the accompanying set of blueprints shows in a general way the construction of the building, there are certain portions of the building that must be shown in greater detail, so that their construction and design may be understood. Drawings at a larger size and scale are therefore made and are called *scale details*. These details consist generally of plans, elevations, and sections of the portion of the building detailed, drawn at a much larger scale than is used in the general plans. These details are made 1/24, 1/16, 1/12, and even 1/4 of the actual sizes of the parts shown. By showing them at these sizes, the details of construction, mouldings, and ornaments can be more clearly shown, so as to be plain to the mechanics who are to work from the drawings. A **scale detail** may, therefore, be defined as a drawing which shows a portion of a building at from 1/24 to 1/4 of its actual size, for the purpose of showing clearly the elementary parts and the construction of that portion. Examples of scale details are shown in Figs. 3 and 4.

24. Full-Size Details.—Full-size details are drawings that are made to show portions of a building at their actual size. The scale details show the general arrangement of portions of the building that may need to be shown at a larger scale than the general plans, but profiles of mouldings, sections through trim, sash, and ornamental work, cannot be shown clearly at these scales; therefore, these indications are elaborated in the full-size details, and are drawn to actual size. Without these full-size explanatory drawings, the scale details would be incomplete. Examples of full-size details are given in Fig. 4.

25. It frequently happens that one sheet of drawings will contain drawings at different scales. Thus, a drawing showing

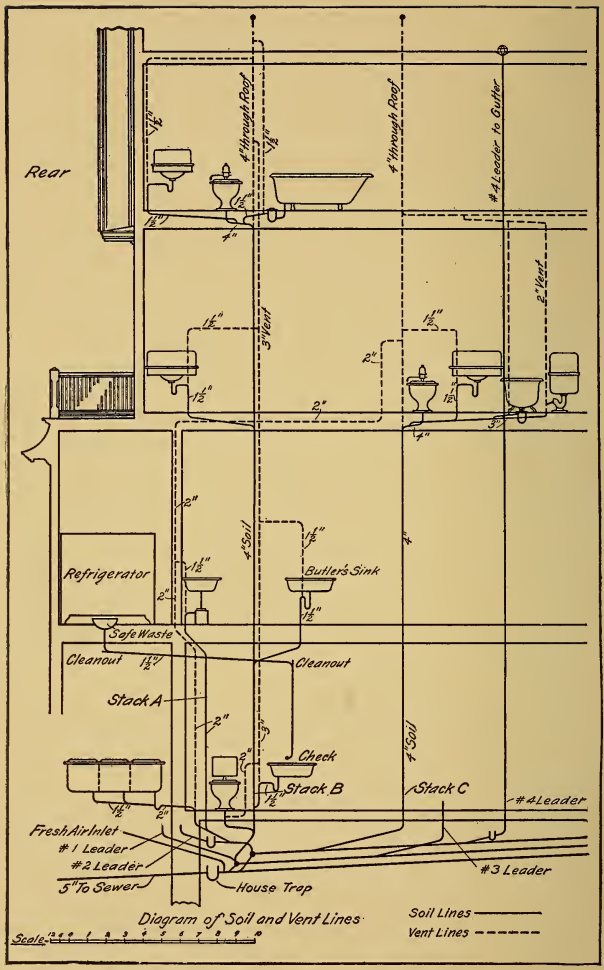

Rear
4" Through Roof
4" Through Roof
#4 Leader to Gutter
2" Vent
3" Vent
4" Soil
4" Soil
Refrigerator
Butler's Sink
Safe Waste
Cleanout
Cleanout
Stack A
Check
Stack B
Stack C
#4 Leader
Fresh Air Inlet
#1 Leader
#2 Leader
#3 Leader
5" To Sewer
House Trap
Diagram of Soil and Vent Lines
Soil Lines
Vent Lines
Scale

FIG. 5

the general construction of a doorway, as Fig. 4, may be drawn to one scale, while some of the details may be drawn to a much larger scale, and the profiles may be full size. Full-size drawings are not always dimensioned, as it is possible to measure the lines with accuracy with the scale or rule.

26. Plumbing Section.—Building Departments in some cities require that a plumbing section be filed before a building permit will be issued. A plumbing section shows the general arrangement of all the plumbing fixtures and their connection to the main sewer by means of the soil lines. A plumbing section is seldom drawn to scale, as it is intended to show the number of fixtures and their arrangement only. In Fig. 5 is shown a portion of a plumbing section of a building having fixtures in the basement, and on the first, second, and third floors.

The plumbing section, as will be noted, contains no dimensions, and is not drawn accurately to scale or in proportion, as the work will be installed in the spaces provided, and in accordance with the requirements of the fixtures. The fixtures are fully described in the specifications, and indicated on the plans.

27. Shop Drawings.—Besides using the architect's drawings, the contractors for such work as the terra cotta, stone, millwork, steel, sheet metal, and heating, prepare special drawings, called *shop drawings*, to be used in constructing their part of the work. In general, these drawings conform to the architect's drawings of the finished work, but they show the special methods of construction used in connection with the various trades. These drawings are usually submitted to the architect for his approval before the work shown on them is begun. Such drawings must be checked carefully by the architect, to insure that they conform to his drawings, and that they do not interfere with the work of other trades, or with shop drawings already approved. When the architect marks these shop drawings *Approved* they become authoritative plans which must be followed in the execution of the work.

In Fig. 6 is shown an example of a shop drawing for an iron stairway to be built into a fire-proof building. A sectional

elevation is shown in (*a*) and a plan of the stairs is shown in (*b*). The stairs extend from the basement floor *a* in (*a*), to

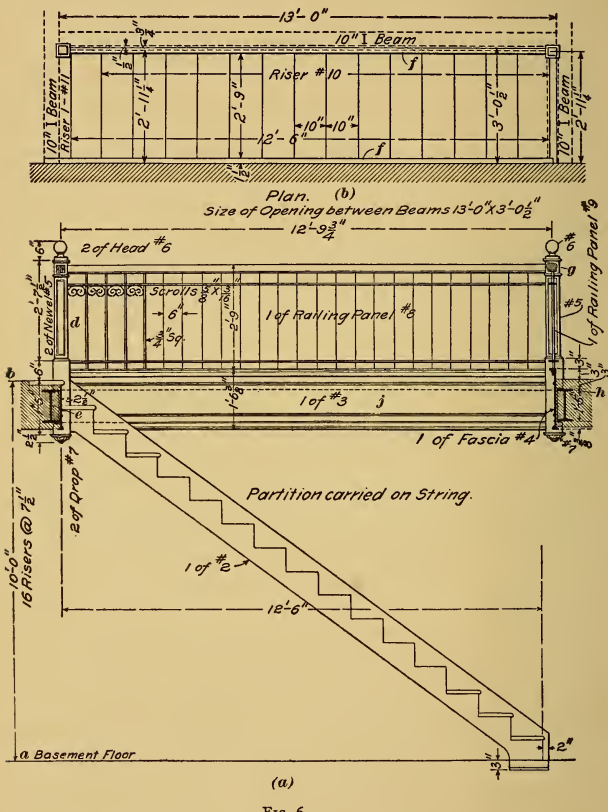


Fig. 6

the first floor *b*, the outline of the steps being plainly shown. The flight of stairs is contained between the two 10-inch I beams 13 feet apart, with a brick wall on one side of the stairs,

and a 10-inch I beam on the other, leaving a clear space of 3′ 0½″ for the stairs, the stairs having a rise of 10′ 0″ from floor to floor. The architect's drawing need not be as complete as shown in this illustration, but the architect must check the dimensions to see that they conform to his drawings, and he must examine the drawings carefully to see that they meet his approval as to style and detail. An example of a shop drawing for terra-cotta work is given later on.

28. Surveys.—In architectural work, the term *survey* means a drawing, made by a surveyor or an engineer, of a lot or piece of property, and sometimes of buildings existing on the property. This survey is useful to the architect in locating the buildings on the ground. It is drawn to scale and shows measurements in feet and decimals of a foot, whereas the measurements on architect's drawings are given in feet, inches, and fractional parts of an inch.

29. Accuracy of Drawings.—While the architect endeavors to have his drawings accurate, it often happens that errors and omissions are made in indicating parts of plans, as well as in dimensions or locations. There is an implied obligation on the part of the contractor finding such errors and omissions to report the discovery to the architect without delay, so that corrections can be made.

When work is to be fitted into a given place in a building, the contractor should obtain the measurement of this place at the building and should work to the dimensions there found, for the actual construction may vary somewhat from the dimensions shown on the plans. To insure against errors due to differences between the dimensions given on the drawings and the actual sizes at the building, an architect frequently places a notation on the plans, and especially on the scale details, to the effect that all dimensions must be verified at the building. Such a notation places the responsibility for the accuracy of the finished work on the contractor. Fig. 3 illustrates the use of this notation.

30. Precedence of Drawings.—The actual size of parts of the building shown on the full-size details are to be used in

preference to the sizes indicated on the scale details. In like manner, the scale details take precedence, in the matter of accuracy, over the working drawings or general plans.

Whenever a dimension is given on drawings, it should be followed in preference to a scaled measurement, as the drawing may have been made out of proportion, or the paper may have either stretched or shrunk. In case of serious discrepancies between the dimensions and the scaled measurements, the matter should be brought to the attention of the architect for a decision as to the correct dimension.

USE OF THE SCALE AND THE RULE

USE OF THE SCALE

31. Drawings Made to Scale.—Elevations, plans, and sections are made at a fraction of the actual size of the building, for the obvious reason that the building is too large to be drawn at its actual size on ordinary sheets of paper. The sheets could not be easily handled if they were so drawn, and the drawings need not be full-size in order to make the construction clear. When made at a fraction of the actual size, they can be drawn on a moderate-sized board and the drawings or blueprints can be handled conveniently at the building.

32. In order to show the plans at the reduced size, they are drawn *to scale*. Most elevations, plans, and sections are drawn to the scale of $\frac{1}{4}$ inch to the foot. When so drawn, each $\frac{1}{4}$ inch on the drawing represents 12 inches, or 1 foot, of the actual building. Such a drawing shows the building at one forty-eighth of its actual size.

The scale of $\frac{1}{4}$ inch to the foot is found by experience to be a very convenient scale to use in laying out buildings of ordinary size. For very large buildings a smaller scale is used, such as $\frac{1}{8}$ inch to the foot, in which case the drawing will be one ninety-sixth of the actual size of the building.

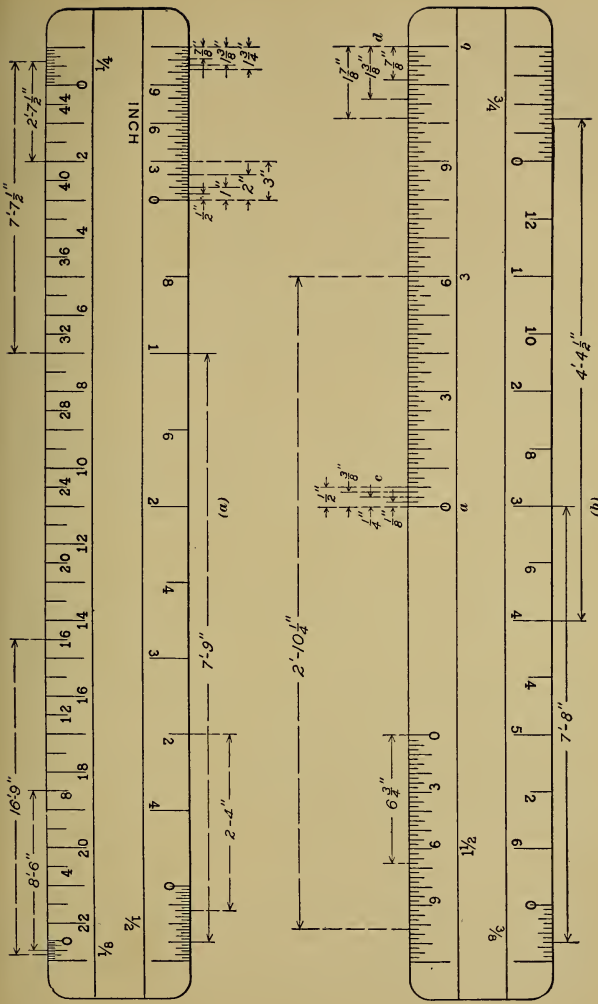


FIG. 7

33. Scale details are made from 1/24 to 1/4 of the actual size of the parts detailed. In such cases the following scales are used:

$\frac{1}{2}'' = 1'\,0''$, or $\frac{1}{24}$ actual size
$\frac{3}{4}'' = 1'\,0''$, or $\frac{1}{16}$ actual size
$1'' = 1'\,0''$, or $\frac{1}{12}$ actual size
$1\frac{1}{2}'' = 1'\,0''$, or $\frac{1}{8}$ actual size
$3'' = 1'\,0''$, or $\frac{1}{4}$ actual size

In full-size details, each inch represents an inch of actual size. The scale at which a drawing is made should always be marked on the drawing. When drawings at different scales appear on one sheet each drawing should be marked so as to avoid confusion.

34. The Architect's Scale.—The architect or designer in laying out drawings to any scale, uses an instrument called a *scale*. Whether the word scale refers to this instrument or to the scale of the drawing can easily be determined by the connection in which the word is used.

An illustration of a convenient type of an architect's scale is given in Fig. 7, the two sides (*a*) and (*b*) of the scale showing all the scales that have already been mentioned. The scale shown in the illustration is only 6 inches in length, which is a very convenient size for carrying in the pocket, and is also handy in making drawings. The standard length for a scale used in the drafting room is, however, 12 inches.

35. On the upper edge of the scale in Fig. 7 (*a*) are the $\frac{1}{8}$-inch and the $\frac{1}{4}$-inch scales. At the left end of the scale, the beginning of the $\frac{1}{8}$-inch scale is indicated by the fraction $\frac{1}{8}$, above which is $\frac{1}{8}$ inch divided into 12 parts, each of which represents an inch at the $\frac{1}{8}$-inch scale. To the right of this divided eighth are divisions of $\frac{1}{8}$ inch clear across the top edge of the scale, each eighth representing 1 foot and every fourth eighth being numbered.

Beginning at the right-hand end of the same edge of the scale, the edge is divided into $\frac{1}{4}$-inch divisions by the longer lines. The first $\frac{1}{4}$ inch is divided into 12 parts which rep-

resent inches at the $\frac{1}{4}$-inch scale. Every $\frac{1}{4}$ is just twice $\frac{1}{8}$, and the divisions are arranged so that the $\frac{1}{2}$-foot divisions of the $\frac{1}{4}$-inch scale are the same as the 1-foot divisions of the $\frac{1}{8}$-inch scale. Every alternate fourth division is numbered, and the user must be careful to avoid using the wrong set of numbers.

36. On the lower edge of the side of the scale shown in (*a*) are found the $\frac{1}{2}$-inch and 1-inch scales, while in (*b*) are shown the $\frac{3}{8}$-inch, $\frac{3}{4}$-inch, $1\frac{1}{2}$-inch, and 3-inch scales. These scales are arranged in pairs and are numbered in a manner similar to the scales already described. With each of these scales, one unit is shown subdivided into at least 12 parts, representing inches, and on the larger scales there may be finer divisions to represent parts of inches. Thus, on the 1-inch scale, at the right-hand lower edge in (*a*), it will be observed that fractions as small as $\frac{1}{4}$ inch may be read direct and the fourths may be divided by the eye so as to read eighths of an inch. On the 3-inch scale, shown in (*b*), the inch divisions are divided so that eighths may be read.

37. Using the Scale.—There are two methods of using the scale in connection with drawings: a given distance may be laid off from a fixed point, or a given space on the drawing may be measured.

In laying off a distance, such as 8 feet 6 inches, from a fixed point, and using the $\frac{1}{8}$-inch scale, place the 6-inch mark of the divided eighth at the point and make a point opposite the 8-foot mark on the edge of the scale, which will give the desired distance. The distance may also be laid off by placing the 8-foot mark at the point and making a point at the 6-inch mark of the divided eighth.

38. To measure a given space between two points on a drawing, the scale is placed so that one of the points is between the limits of the unit which is divided into inches, and the other point is at one of the unit marks on the edge of the scale. By reading the number of feet and inches between the two marks on the scale, the desired dimension is found.

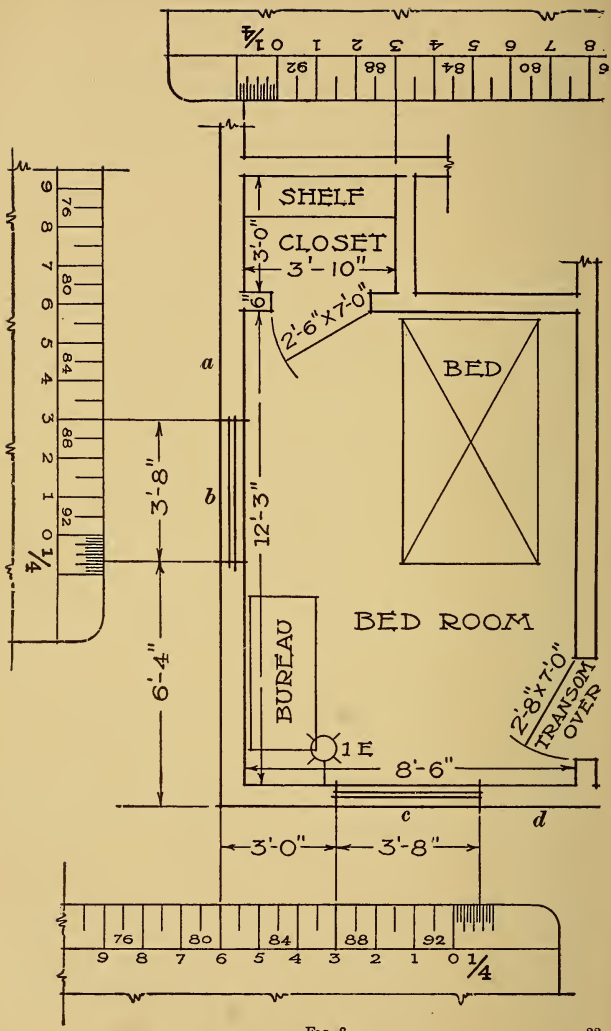

SHELF
CLOSET
3'-10"
3'-0"
6"
2'-6"x7'-0"
BED
BED ROOM
BUREAU
1 E
2'-8"x7'-0"
TRANSOM OVER
8'-6"
12'-3"
3'-8"
6'-4"
3'-0"
3'-8"
a
b
c
d

Fig. 8

39. Reading Dimensions With the Scale.—In Fig. 8 is shown a portion of a plan of a dwelling. A bedroom and a closet are represented at the scale of $\frac{1}{4}$-inch to the foot, or $\frac{1}{48}$ of its actual size. The $\frac{1}{4}$-inch scale on the measuring scale will, therefore, be used in determining the measurements. The scale shown in the illustration is numbered at every foot for convenience in reading. In the wall *a* is shown the window *b*. This window is marked on the drawing as being 3′8″ in width. When the scale is applied to the width of the opening on the drawing, it will be seen that the width is three of the $\frac{1}{4}$-inch divisions on one side of the O mark, and eight of the $\frac{1}{12}$ divisions on the other side of the O mark, thus giving the dimension 3′8″. By applying the scale in a similar manner to the window *c* in the wall *d*, the same result will be found. The distance between the side of the window and the corner of the wall will be found to be 3′0″, as the distance is three of the $\frac{1}{4}$-inch spaces.

The width of the closet will be found by applying the scale as shown at the upper part of the drawing, and is 3′10″. The scale must always be applied parallel to the distance to be measured.

USE OF THE RULE

40. The architect and his draftsmen use the scale in laying out and in reading the dimensions of the drawings that they make for buildings. The contractor and foremen generally use the *rule* sometimes called the *carpenter's rule*. Either the 2-foot rule or the zigzag folding rule may be used. These rules are divided into inches and fractions of an inch, such as $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, and $\frac{1}{16}$. Dimensions such as are marked on the drawing shown in Fig. 8 are usually given, but in Fig. 9 is given an illustration of the methods used in taking off dimensions or measurements from a drawing by means of a rule.

41. Example of the Use of a Rule.—In Fig. 9, on the right-hand side, a rule is shown applied to a drawing to obtain the length of the room, and the measurement shown is $3\frac{1}{16}$ inches. The drawing is at the scale of $\frac{1}{4}$-inch to the foot. The

3 inches, therefore, represent 3×4=12 feet, and the $\frac{1}{16}$ inch represents $\frac{1}{4}$ of 1 foot, or 3 inches. This dimension will, there-

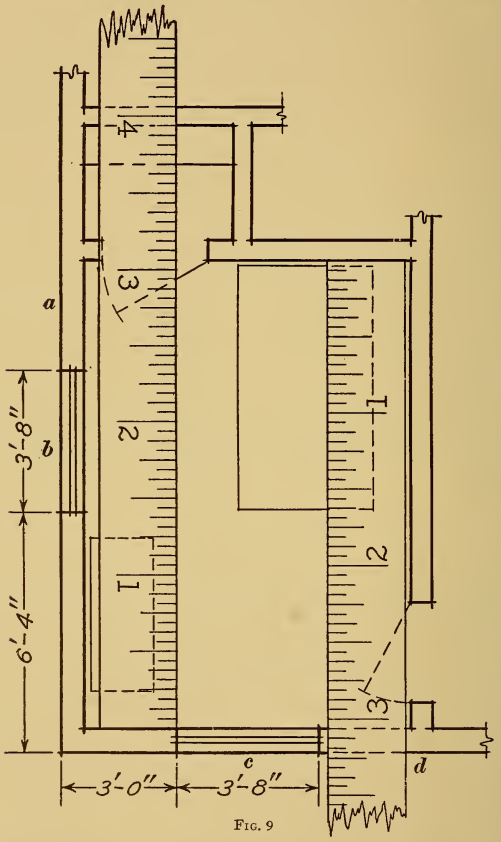


FIG. 9

fore, be read as 12 feet 3 inches. The length of the room including the closet is $3\frac{5}{16}$ inches by the rule. The 3 inches represent 12 feet and the $\frac{5}{16}$ represents $3\frac{3}{4}$ feet or 3 feet 9 inches.

The total length of the line is, therefore, 15 feet 9 inches. It should be remembered that each inch on the rule equals 4 feet, each $\frac{1}{4}$ inch represents 1 foot, and each $\frac{1}{16}$ inch represents 3 inches at the scale of $\frac{1}{4}$ inch = 1 foot.

42. Measuring Scale Details.—Scale details are made at scales such as $\frac{1}{2}$ inch to the foot, $\frac{3}{4}$ inch to the foot, etc. In measuring details drawn at $\frac{1}{2}$ inch scale, each inch on the rule represents 2 feet on the drawing, and each $\frac{1}{16}$ inch on the rule represents $\frac{1}{8}$ of a foot, or $1\frac{1}{2}$ inches on the drawing.

In measuring details drawn at the scale of $\frac{3}{4}$ inch to the foot, each $\frac{3}{4}$ inch on the rule measures 1 foot on the drawing, each $\frac{1}{4}$ inch measures 4 inches on the drawing, and each $\frac{1}{16}$ inch

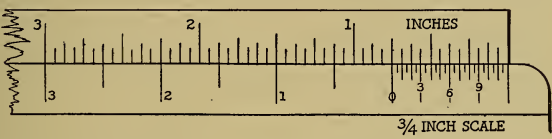


FIG. 10

on the rule represents 1 inch on the drawing. A comparison of a portion of a 2-foot rule with a portion of the $\frac{3}{4}$-inch scale is shown in Fig. 10, and shows this relation clearly.

Drawings made full-size can be measured directly with the rule, as the represented objects or parts of the building are at their actual size.

43. Practice in the Use of the Scale and Rule. Those wishing to obtain a clear understanding of what drawings represent, should purchase a scale and measure the various parts of the accompanying blueprints, checking the dimensions, etc., and thus become familiar with the use of the scale. It will also be well to purchase a 2-foot rule, and to become familiar with its use in measuring plans.

SYMBOLS FOR MATERIALS

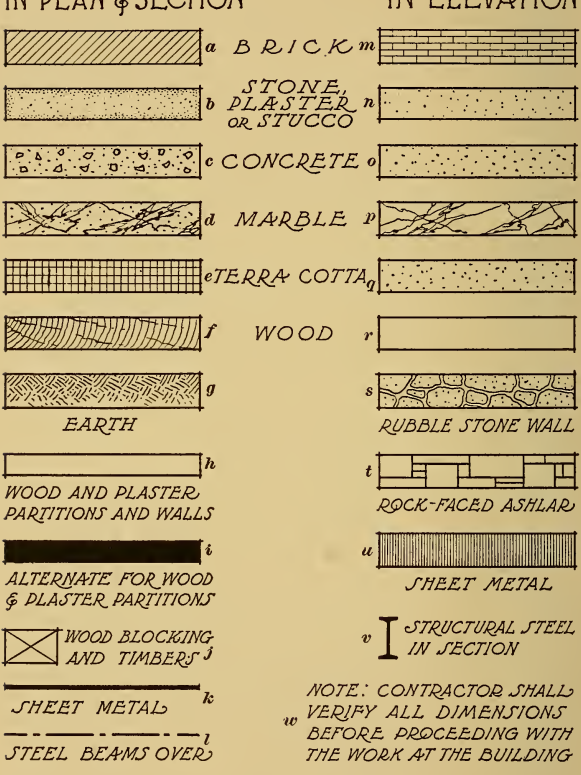


FIG. 11

INDICATIONS USED IN DRAWINGS

INDICATIONS OF MATERIALS

44. Methods of and Reasons for Indicating Materials.—As has been stated, various indications are used to represent the materials employed in the construction of buildings. These indications consist of lines, dots, and other marks, forming a different indication for each material, so that just what material is used in the construction of a given part may be determined at a glance. The reason for indicating the materials in this way is that these indications may readily be made on the tracings, and any number of blueprints may be made from the tracings. In the past, colors were used to indicate these various materials. As colors could not be readily printed, it was necessary to make several drawings or prints and to color every one separately by hand. This was very expensive, and the present method of indicating by various markings and lines has been adopted. Examples of these indications are given in Fig. 11. All these indications are more or less arbitrary, and there is no uniform practice in using them, but they represent the practice of a great many of the leading architects of the United States.

45. Materials Seen in Section.—Plans and sections usually show cuts made through various materials, and the indications of some of the principal materials so cut are shown in Fig. 11 at *a* to *l*, inclusive. At *a* is shown the indication for brick; at *b* stone, plaster, or stucco; at *c*, concrete; at *d*, marble; at *e*, terra cotta; at *f*, wood; at *g*, earth; at *h*, wood and plaster partitions and walls; at *i*, alternate for wood and plaster partitions; at *j*, wood blocking and timbers; at *k*, sheet metals; and at *l*, steel beams over an opening in the plan.

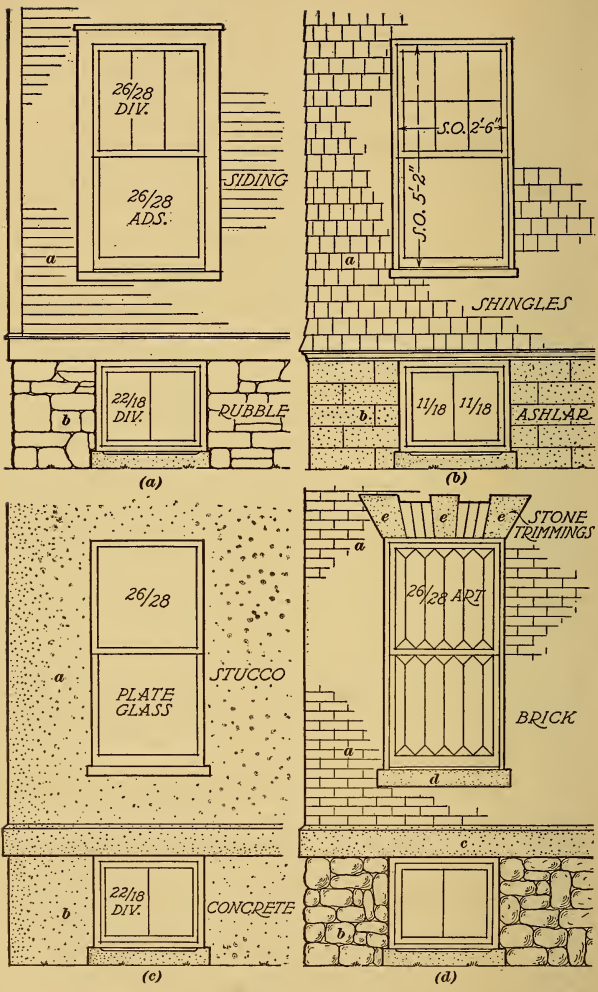

26/28
DIV.
26/28
ADS.
SIDING
a
22/18
DIV.
RUBBLE
b
(a)
S.O. 2'-6"
S.O. 5'-2"
a
SHINGLES
11/18
11/18
ASHLAR
b
(b)
26/28
a
PLATE
GLASS
STUCCO
22/18
DIV.
b
CONCRETE
(c)
e
e
e
STONE
TRIMMINGS
a
26/28 ART
BRICK
a
d
c
b
(d)

FIG. 12

46. Materials Seen in Elevation.—In Fig. 11 from *m* to *u*, inclusive, indications are shown which represent materials as indicated in elevation. Thus, at *m* is an indication of brick in elevation; at *n*, stone; at *o*, concrete, etc. It will be noted that the indications at *n*, *o*, and *q* are somewhat similar, but reference to the corresponding parts in the plans will assist in distinguishing between these indications. In some cases, materials, such as stone, are shown in such a manner as to indicate the sizes or shapes of the pieces of material used, or the method of placing them in the building, as in *s* and *t*. These indications are generally carried over only a small portion of the total surface shown on the drawing.

47. Application of Indications.—In Fig. 12 are shown examples of the use of the indications previously mentioned, together with additional indications that are often shown on drawings. In Fig. 12 (*a*) at *a*, where beveled siding is indicated, the horizontal lines are spaced to show the actual width of the boards. At *b* rubble is indicated. In (*b*) wood shingles of random width are indicated at *a*, and ashlar at *b*. In (*c*) at *a* a stucco surface is indicated, the same indication being used whether the stucco is applied to metal lath, hollow tile, or other material. At *b* a concrete surface is indicated, the indication being very similar to that for stucco. In (*d*) at *a* a brick surface is shown, the indication being the same regardless of whether the brick is a part of a solid wall, or a brick veneer supported by a wooden frame. At *b* is an indication of a fieldstone wall, at *c* a stone water-table, at *d* a stone sill, and at *e* stone trimmings in the arch over the window.

48. To show the application of this system of indicating materials in working drawings, reference may be made to the blueprints of the South Elevation, Basement Plan, and First Floor Plan, and to the Transverse and Longitudinal Sections. In the South Elevation, stucco surfaces are indicated at *e*, a brick surface at *f*, a shingled surface at *g*, and metal surfaces at *h*. The indications of the material on a small portion of the surface are obviously sufficient to identify the entire surface. In the Basement Plan at *c* is shown a concrete wall, and at *d*

is shown a brick wall, at the end of which is a brick chimney *e*. In the First Floor Plan at *c* is shown a brick fireplace. Two kinds of brick are indicated by the different directions of the lines, one indicating the brick used in facing the mantel, the other showing the common brickwork used for the body of the chimney. In the Transverse Section at *a* is a section through a concrete wall, surrounding which are indications of earth. At *b* is a section through a concrete wall, at *c* is a section through the concrete floor, and at *d* is a section through a brick wall which supports a brick trimmer arch *e* under a concrete hearth.

49. It is advisable to place a list, or key, of the indications on the drawings, as is done in the Basement and First Floor Plans, and in the Transverse and Longitudinal Sections.

50. Descriptions and Abbreviations.—There are numerous things that cannot be shown completely by the use of indications. These are usually indicated by brief descriptions and abbreviations which are put on the drawings by the draftsman. In some cases the entire description must be printed on the drawing. An example of a sentence which is sometimes placed on a drawing is given in Fig. 11 at *w*. Further examples of these descriptions or notes may be seen by inspecting the elevations, plans, and sections.

51. Words or abbreviations of words are also used as indications, and by usage have acquired definite meanings. Examples of these abbreviations are given in the accompanying list. Further examples of abbreviations will be found in the South Elevation, such as *S.O.*, which indicates sash opening, and *R.C.*, which indicates rain conductor. In the First Floor Plan are shown abbreviations such as *Rad.* for radiator, *Reg.* for register, and *Refrig.* for refrigerator, etc.

EXAMPLES OF ABBREVIATIONS USED ON DRAWINGS

Abbreviations	Explanations	Abbreviations	Explanations
C. I.	Cast-iron	Col.	Column
Gal. I.	Galvanized iron	Rad.	Radiator
W. I.	Wrought iron	Reg.	Register
T. C.	Terra cotta	D. H.	Double-hung sash
W. P.	White pine	No. or #	Number
Y. P.	Yellow pine	B. L.	Building line
D. S.	Double-strength glass	G. L.	Grade line
P. G.	Plate glass	C. L.	Center line
L. G.	Leaded glass	C. C.	Center-to-center

INDICATIONS OF PARTS, OR ELEMENTS, OF BUILDINGS

52. General.—On drawings, the indications of the various parts, or elements, of a building should show more than the mere materials of which the parts are constructed; the peculiarities of the construction of the various parts should be indicated. This construction depends on the nature of the materials used, and the character of the building in which the parts occur.

53. Building materials may be used in various combinations in the same building. Thus, a brick wall may have an exterior facing of face or special brick; a hollow-tile wall may support a facing of brick; a wooden frame may support an outer covering, or veneer, of brick or stucco; or a steel frame may be used to support walls of brick, terra cotta, or stone. A building may have exterior brick walls, with wooden, steel, or reinforced-concrete floor construction.

54. In general, buildings in which the foundations and exterior walls are constructed wholly or principally of brick, stone, hollow tile, or concrete, are known as *masonry buildings*.

When the walls or floors are supported principally on a framework of structural steel, the buildings are known as *steel-skeleton buildings*.

Buildings in which the principal parts, such as the foundations, walls, floors, and roofs, are built of concrete reinforced with metal rods or bars, are known as *reinforced-concrete buildings.*

Buildings in which the superstructure, or the portion of the building above the foundation wall, consists of a wooden framework which supports an outer covering of siding, shingles, stucco, or other material, are known as *wooden-frame buildings.* The superstructure is usually supported on a masonry foundation, which may be of brick, stone, hollow tile, or concrete.

55. Buildings are made up of many parts, among the more important being the footings, foundations, walls, piers, partitions, chimneys, floors, roofs, doors, and windows. Some of these parts are shown in the plans, others in the elevations, and still others are seen only in the sections. Thus, the footings and foundations are indicated usually in the basement plan, and are seen also in the sections, the construction of walls, piers, and partitions is seen in the plans, while the appearance of the outside walls and piers is seen in the elevations, and the appearance of the partitions and inside piers is seen in the sections. Chimneys are seen in the plans, and in the sections, while portions of them are seen in the elevations, as in the blueprint of the South Elevation. Floors and roofs are seen principally in the sections, although the roof construction appears partly in the plans, as in the Third Floor Plan; partly in the elevations, and in the sections.

Since the indication of the parts of the buildings depends so much on the nature of the materials used, these indications will be discussed in the following articles under the headings of the various materials.

STONE

56. Footings and Foundations.—Footings and foundations are generally built of some masonry material, such as stone, brick, concrete, or tile. Except for large and important buildings, footings are seldom shown on a separate plan. The customary method of indicating footings is by broken lines

on each side of the wall, as at *a* in the Basement Plan. The width of the footing is shown on the Basement Plan, as at *a*, and the vertical thickness or height of the footing is shown in the Sections. When the footing is shown in section, the space between the lines of the footing is filled with the indication of the material of which the footing is composed, as at *a* in the Longitudinal Section. When seen in elevation in the Section, the footing is shown only in outline, as at *b*.

57. The foundation walls, at least up to grade, are generally made of rough masonry or concrete. It is, therefore, important to show the grade line, or the finish line of the ground, on the elevations and sections of the building, in order to show where the rough masonry stops. The portions of the foundation wall projecting above the finished grade are usually built with more care and with better materials than those below. The foundation wall generally contains the windows which light the cellar or basement, and the plan of such cellar or basement is commonly taken so as to be a section through these windows. Consequently, the location of the windows can be marked on the cellar or basement plan.

58. The vertical sections through the foundation walls are usually taken through one of the wall openings, such as a window or door. This enables the architect to show the relation of the door or window sills and the construction over the tops of these features. The height of the window and door sills above the finished cellar floor can then be marked on the section for the instruction of the contractor. When the section does not pass through the basement windows or doors, the heights of the window sills are sometimes marked on the elevations, as at *i* in the South Elevation.

59. Stone Walls and Piers.—Stone walls and piers are shown in plans by lines bounding the masonry. These lines give the correct size of the construction according to the scale at which these parts are shown. Dimensions are given for the thickness of walls, and the sizes of piers. The space between the lines of the walls and inside of the bounding lines of the

piers is filled with the indication of the material of which the wall or pier is composed. Thus, in Fig. 13 (*a*), a stone wall is indicated; in (*b*) a brick wall faced with stone, and in (*c*) a stone pier. In masonry seen in plan or section, there is no attempt made to represent the individual stones, bricks, or pieces of material in the plan or sections, it being understood that the work will be done according to the specifications or the indications on the elevations.

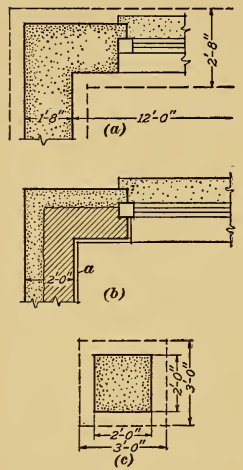


FIG. 13

60. When walls of different thicknesses occur in a building, each wall should be marked so that the workmen will know where the different thicknesses occur. The thickness indicated on the plans usually refers to the actual thickness of masonry rather than to the total thickness of the masonry and any plastering which may be applied to it. An additional line close to the inner surface of the wall as at *a* in Fig. 13 (*b*), indicates that the wall is furred and plastered. When plastering is applied directly to the wall, the additional line is omitted, the wall being shown as in (*a*). In the latter case the plastering would be called for in the specifications. Piers are rarely furred, the plastering, when required, being applied directly to the surfaces.

61. The practice is divided between indicating the thickness of masonry in inches, as 18″, 20″, 24″, etc., and by feet and inches, as 1′6″, 1′8″, 2′0″, etc. The figures giving the thickness of walls should be read carefully so that 18″ will not be mistaken for 1′8″, or 20″ for 2′0″, etc. In general, the dimension is given in inches when it refers to the thickness of the wall, and in feet and inches when it is a dimension from one face of the wall to the other, in connection with a line of dimensions across the building.

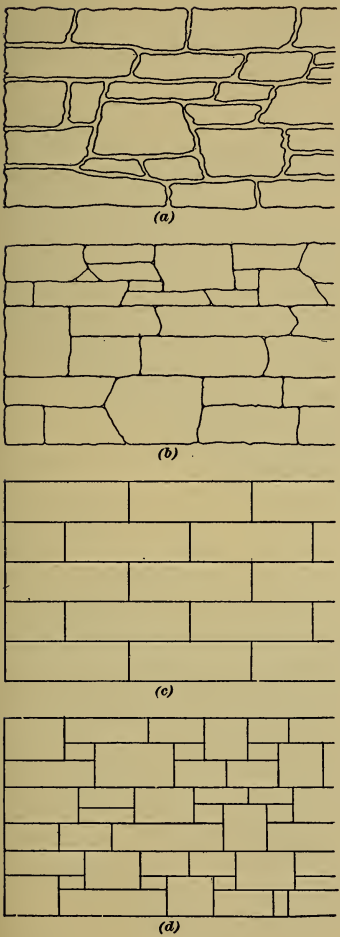


FIG. 14

62. Stone walls seen in elevation are indicated according to the manner in which they are constructed. Stone may be used to make a given length of wall without regard to the size, shape, or arrangement of the separate stones, or it may be laid to a prearranged plan. In the first case the work is known as *rubble,* and in the second case it is known as *ashlar.*

63. A typical method of showing rubble work on the elevations is given in Fig. 14 (*a*), a greater or less portion of the wall being thus indicated. The finished wall of this construction is shown in Fig. 15. This work is known as *random rubble,* and the character of the work will vary with the nature of the stone. Where thin flat stones are used, the drawing will naturally represent such stones. Where rounded boulders are used, a different appearance will result, resem-

bling that shown at *b* in Fig. 12 (*d*). When the rubble is to be roughly coursed, it is indicated as in Fig. 14 (*b*), and the finished appearance of the wall will be shown in Fig. 16. This work is known as *coursed rubble.*

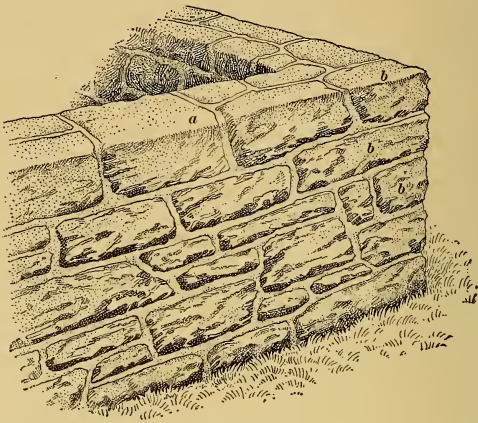


FIG. 15

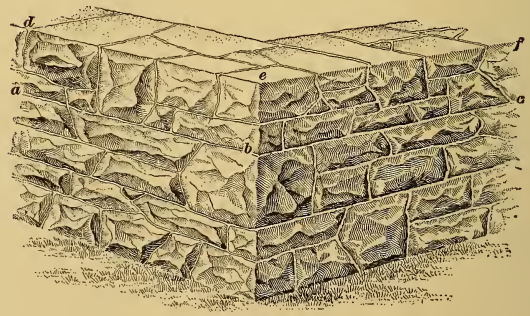


FIG. 16

64. Ashlar consisting of stones cut to certain dimensions is indicated as in Fig. 14 (*c*). This is known as *coursed ashlar.*

A finished wall of this construction is shown in Fig. 17. Ashlar is frequently used as *random-coursed ashlar,* as indicated in Fig. 14 (*d*). A finished piece of random-coursed ashlar is shown in Fig. 18.

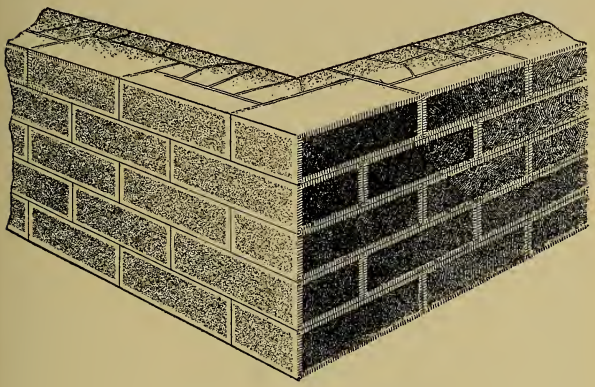


Fig. 17

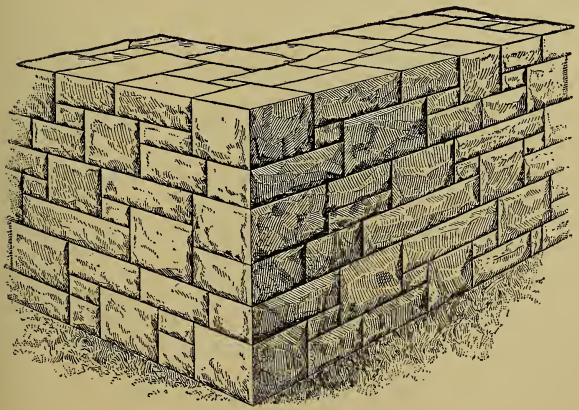
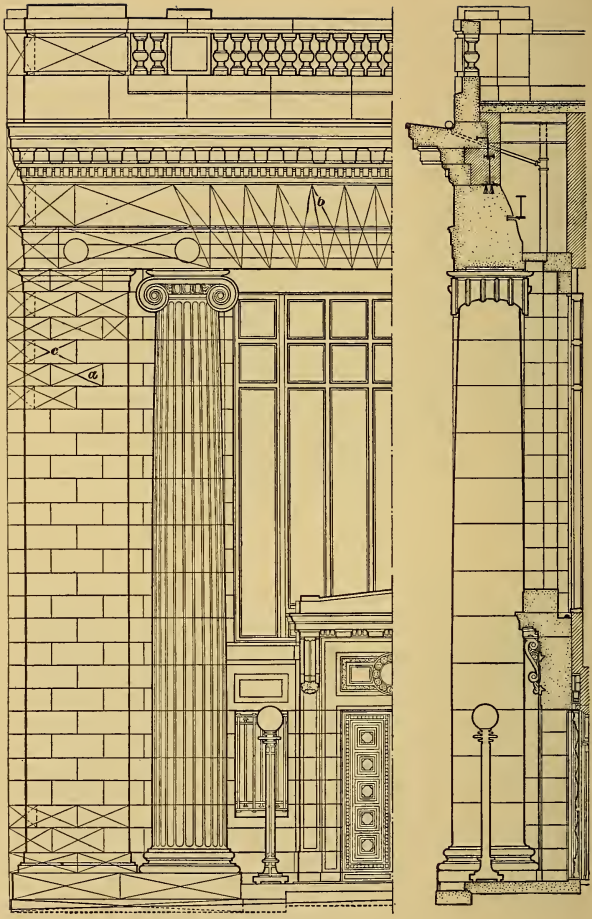


Fig. 18



(a) FIG. 19 (b)

65. Stone walls of the kinds shown in Figs. 14 to 18 are sometimes solid, as shown in Figs. 15 to 18, but generally the stone is only a facing, or veneer, as shown in Fig. 13 (*b*), backed up with brick, a cheaper stone, or tile. Stone walls are seldom less than 20 inches thick, although in some localities where the stone occurs in thin layers with parallel beds, they may be built as thin as 16 inches.

66. When stone is cheaper than brick, stone piers are sometimes used, but generally in the basement only. These piers are indicated in the same manner as outside walls. The dimensions which appear on stone piers, as in Fig. 13 (*c*), are for the masonry only, as any plaster that might be applied to the masonry is not indicated on the plans. Stone piers are seldom furred.

67. Cut-Stone Fronts.—Elaborate cut-stone fronts have each stone shown on the elevations, as in Fig. 19 (*a*). Individual stones *a* are shown by drawing lines from the diagonally opposite corners. The stones of the arch *b* are also shown by diagonal lines to indicate that they are single stones extending from the top of the columns to the bottom of the cornice. The parts of stones which extend behind pilasters and other stones are shown by dotted lines, as at *c*. A further indication of the jointing is seen in the section (*b*), which shows the arch stones and cornice supported by steel beams and backed up with brickwork.

68. When the fronts of the building are of cut stone, as shown in Fig. 19, they are usually backed up with a cheaper material, such as rubble stonework, brick, or hollow tile. The kind of stone and the manner of constructing the wall are generally shown in the small-scale sections and on large-scale details, but must also be fully described in the specifications.

69. Before any of the stone can be cut for a front, such as in Fig. 19, working or shop drawings must be prepared showing the exact shape of every stone. These drawings are generally made by the stone contractor who cuts the stone, and his drawings are submitted to the architect for approval.

BRICK

70. Brick Walls.—The inside and outside faces of brickwork are shown on plans by lines, as in Fig. 20 (*a*) and (*b*), the space between the lines being filled with the brick indication. A brick wall is sometimes backed with tile and is indicated as shown in Fig. 20 (*c*), and sometimes faced with the stone and indicated as in Fig. 13 (*b*). When brick walls are furred, an additional line is shown, as at *a* in Fig. 20 (*d*), but plaster applied directly to the wall is not indicated, a plastered wall showing the same indication as one not plastered. The measurement of the wall in any case refers to the thickness of the actual brickwork. Furring and plastering will add about 2 inches to this thickness.

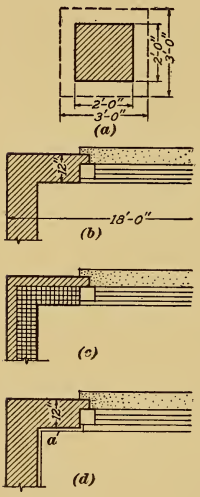


FIG. 20

The thickness of the brick wall is determined by the number of rows of bricks in the wall, each row being 4 inches to $4\frac{1}{2}$ inches thick. A wall of two rows is between 8 inches and 9 inches thick; one of three rows is between 12 inches and 13 inches, and one of four rows is between 16 inches and 18 inches thick. Bricks vary somewhat in size and, therefore, cause a variation in the thickness of the wall. In localities where the smaller bricks are used, the walls will be about 8 inches, 12 inches, 16 inches, etc., thick, and may be so marked on the plans, while in places where larger bricks are used the walls will be 9 inches, $13\frac{1}{2}$ inches, 18 inches, etc. The wall is laid to the outside lines of the building, any variation in thickness due to the size of the bricks or to the application of furring and plastering coming on the inside of the wall.

71. Face Bonds.—Brickwork is laid in a number of ways, the object being to secure a pleasing appearance by the arrange-

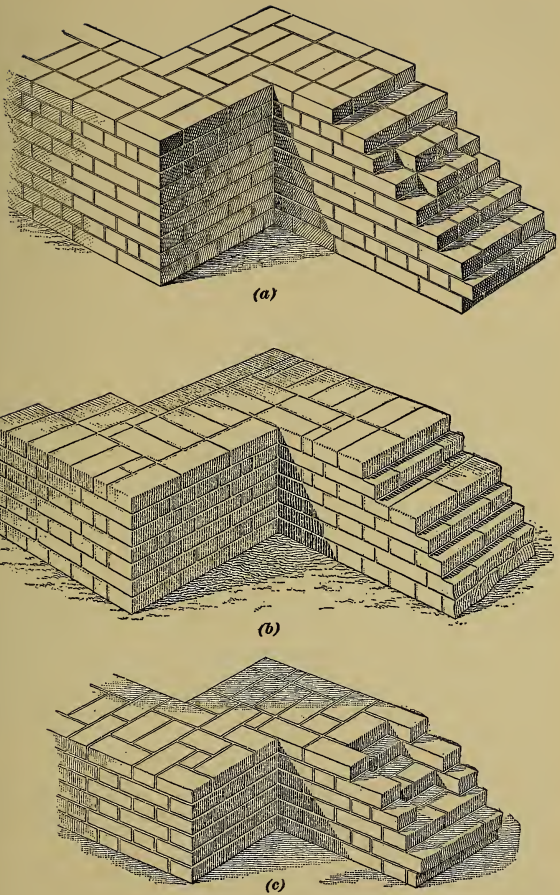


FIG. 21

ment of the bricks, and to bond the bricks together in the wall. Brickwork is indicated frequently on the quarter-scale elevations by lines showing the horizontal and vertical joints, as at *a* in Fig. 12 (*d*). In some cases, however, only the horizontal joints are shown. Scale details are prepared sometimes, especially when the more elaborate bonds are used, the drawing showing every brick in the face of the entire wall. *Common*, or *American, bond* is shown in Fig. 21 (*a*), *English bond* in (*b*), and *Flemish bond* in (*c*). When a special bond or pattern is used in the design, such bond or pattern, even when shown in scale details, usually is indicated in the quarter-scale elevations by suitable wording, and is described in the specifications.

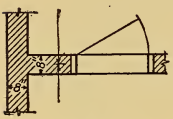


Fig. 22

72. Brick Partitions.—Interior brick walls, or brick partitions, are shown in plan with a line for each face of the wall, as in Fig. 22. If the partition is plastered, the finished wall will be $\frac{3}{4}$ inch to 1 inch thicker for each side on which plaster is applied, or $1\frac{1}{2}$ inches to 2 inches thicker for the entire wall when both sides are plastered. This extra thickness, however, is not shown on the plans, and no additional line is drawn to indicate the plaster when it is applied directly to the brick surfaces. An 8-inch brick wall would be marked *8″*, whether plastered or not. The dimensions showing the location of brick partitions are usually given to the center of the partition, so as to divide whatever variation there may be between the adjacent rooms.

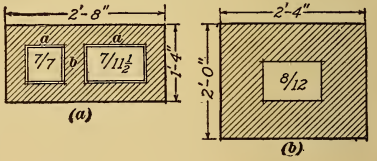


Fig. 23

73. Brick Piers.—Brick piers are shown in outline in plans, as in Fig. 20 (*a*), the space inside the outline being filled with the brick indication. The dimensions are given to the bounding lines of the brickwork, whether the pier is plastered

or not. Dimensions are sometimes given to the center lines of the piers, and this is particularly the custom with small piers, where the actual size may vary somewhat on account of the size of the bricks used.

74. Chimneys.—A chimney consists of one or more flues surrounded by a wall of sufficient strength. Chimneys are built usually of brick, although other materials such as stone, hollow tile, or concrete are sometimes used. In brick chimneys there must be at least 4 inches, or one thickness of brick, around the flue, as in Fig. 23 (*a*). When only 4 inches of brickwork is used around the flue, or when materials other than bricks are used, the chimney should be lined with terra-cotta flue lining *a* as a protection against fire, which might otherwise find its way through the joints. When the chimney is built with 8-inch brick walls, as in (*b*), the terra-cotta lining may be omitted.

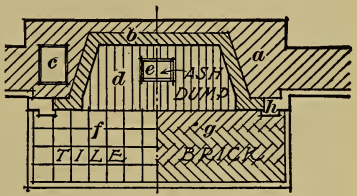


Fig. 24

Two or more flues combined in one chimney should have thin partitions of bricks between the flues, as at *b* in (*a*). These partitions, known as *withes*, separate the flues and bond the outside walls of the chimney together.

The sizes of the flues as indicated in Fig. 23 are 7″×7″, 7″×11½″ and 8″×12″.

75. Fireplaces.—In Fig. 24 is a plan of a fireplace. The fireplace is in a brick chimney *a*, as is indicated by the diagonal lines. The fireplace opening is lined with face brick *b*, as indicated by the diagonal lines in the thin space around the opening. At the left of the fireplace opening at *c* is a rectangular space surrounded by double lines. This space represents a flue coming up from below and passing the fireplace. The double line indicates a terra-cotta flue lining. The lines *d* in the hearth, or floor of the fireplace, represent the joints between the bricks

that are used to pave the fireplace. At *c* is an iron ash door with a cover supported on pivots, which opens into a flue through which the ashes drop into an ash-pit in the cellar. The portion of the hearth that extends in front of the fireplace is shown finished in tile on the left side *f*, and with bricks *g* on the right side. These sides are shown differently to show the different indications for these materials. The double lines around the outside of the tile and brick hearths indicate a wooden border that is fitted against the brick and tile, and is nailed to the floor. At *h* is indicated the section through the mantel or wooden finish of the fireplace that forms a framework enclosing the face brick of the fireplace opening. A study of the fireplaces shown in the living room and on the porch, in the First Floor Plan and in the Longitudinal Section, will show the use of these indications.

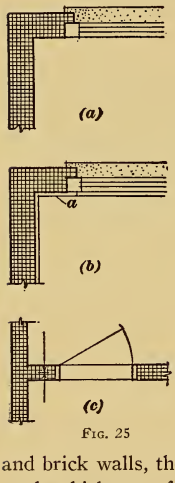


FIG. 25

HOLLOW TILE AND TERRA COTTA

76. Hollow-Tile Walls and Partitions.—Hollow tile is used for walls and partitions in practically the same manner as brick, the usual indication being given in Fig. 11 (*e*). The walls may be from 6 inches to 16 inches or more in thickness, and the inside surface of the tile may be furred out in the same manner as brick walls. As with stone and brick walls, the measurement of the hollow tile wall refers to the thickness of the tilework, and not to the combined thickness of the tile, furring, and plastering. In Fig. 25 (*a*), is shown a tile wall as it would appear in plans with or without plaster on the interior surface or stucco on the exterior surface. In (*b*) is shown a similar wall furred. The additional line *a* indicates the furring and plastering, in the same manner as described for stone and brick. In (*c*) are shown partitions of hollow tile. These indications will usually appear in the architect's plans when hollow tile is used.

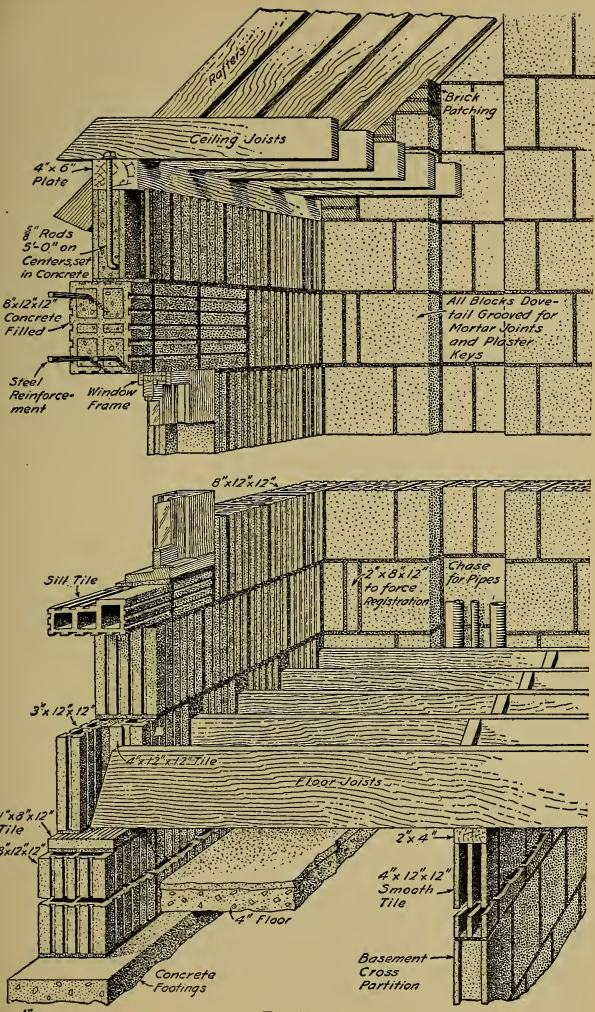

Rafters
Brick Patching
Ceiling Joists
4"x6" Plate
⅝" Rods 5'-0" on Centers, set in Concrete
8"x12"x12" Concrete Filled
All Blocks Dovetail Grooved for Mortar Joints and Plaster Keys
Steel Reinforcement
Window Frame
8"x12"x12"
Sill Tile
3"x8"x12" to force registration
Chase for Pipes
3"x12"x12"
4"x12"x12" Tile
Floor Joists
1"x8"x12" Tile
8"x12"x12"
2"x4"
4"x12"x12" Smooth Tile
4" Floor
Basement Cross Partition
Concrete Footings

FIG. 26

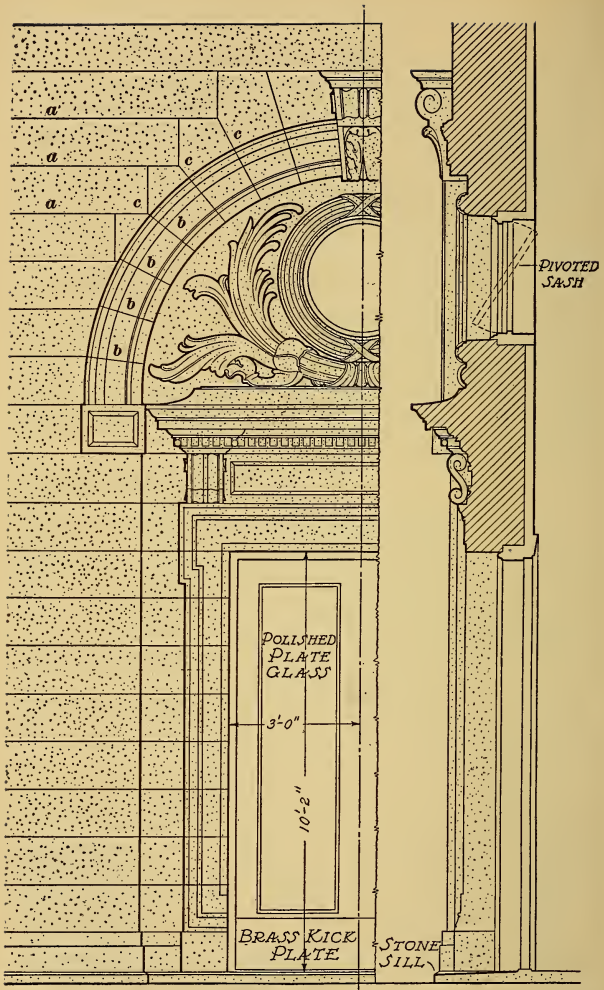

a
a
a
c
c
c
b
b
b
b
b
PIVOTED SASH
POLISHED PLATE GLASS
3'-0"
10'-2"
BRASS KICK PLATE
STONE SILL
(a)
(b)

FIG. 27

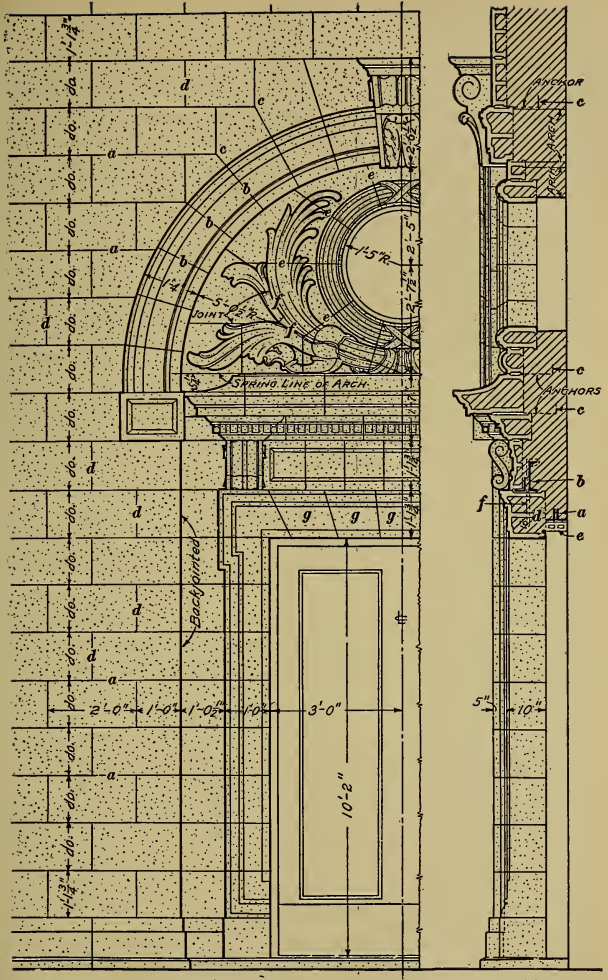

1'-1½"
do.
d
a
c
b
e
2'-6"
2'-5"
1'-5"R.
2'-7½"
5'-0½" JOINT
f
String Line of Arch
g
Backpointed
2'-0"
1'-0"
1'-0½"
3'-0"
10'-2"
ANCHOR
ANCHORS
5"
10"
(a)
(b)

Fig. 28

77. Some types of hollow tile may be used with the surfaces exposed, in which case the elevation shows the general shape of the blocks, and suitable wording indicates the particular material used. Usually, however, the tile surface is coated with stucco, when a finish similar to *a* in Fig. 12 (*c*), is indicated. The floor plans, sections, and specifications are depended upon for further information regarding the construction or use of hollow tile.

In Fig. 26 are shown portions of a building with walls and partitions of hollow tile. This illustration shows the construction at various points as it would be found in first-class work. In this figure the outside walls are 8 inches thick, being built with 8″×12″×12″ blocks. The partitions are 4 inches thick, being built of 4″×12″×12″ blocks. The surfaces of the partition blocks are smooth, being intended for use without plaster. The outer faces of the walls are designed to receive a coating of stucco.

78. Architectural Terra Cotta.—A class of burned clay used for exterior decoration is known as *architectural terra cotta.* This material is used in a manner similar to fine cut-stone work.

79. Architect's Drawing for Terra-Cotta Construction.—The architect generally makes carefully detailed drawings for the doorways, cornices, or other parts of the building made of terra cotta, in a manner similar to that described for stone, in order that the design may be clearly understood and faithfully carried out. An example of such a drawing is given in Fig. 27, which is a detail of an ornamental doorway. In (*a*) is a half elevation, and in (*b*) is a section taken through the center line of the doorway. In this drawing there is no indication for the thickness or construction of the terra cotta. The work of indicating the terra-cotta construction is left to the draftsman in the office of the terra-cotta manufacturer, who makes a drawing like that shown in Fig. 28.

In small-scale drawings it is difficult to indicate terra cotta by the ordinary method, as this material is rarely over 1 inch thick, and, therefore, does not permit indications to be made

at small scales. In large-scale details, however, the material can be indicated as in Fig. 28 (*b*). The characteristic form of the blocks, as shown in this figure, is such as to identify clearly the parts that are formed of terra cotta. The hatching inside the blocks indicates brickwork with which the hollow spaces in the terra-cotta blocks are filled.

80. Example of a Manufacturer's Drawing.—In Fig. 28 is shown the manufacturer's shop drawing of the same entrance that was shown in Fig. 27. It will be noted in Fig. 28 (*a*), that the horizontal joints *a*, of the plain wall, the radiating joints *b*, of the arch, and the joints *c* between the wall and the arch, as shown in Fig. 27, have been retained. Vertical joints *d*, Fig. 28 (*a*), however, have been added to show the length of the wall blocks. The joints *e* and *f* are suggested for the ornament over the entrance. These joints are made to follow the form of the ornament as far as possible, so that they may be partly concealed.

In Fig. 28 (*b*) are shown the contours of the terra-cotta blocks that occur in this section, and also the depths that these blocks are set into the wall, and the manner in which they are secured or supported. All of the terra cotta over the doorway, and the masonry with which it is backed up, are supported by the steel members shown at *a* and *b*. Anchors *c* are used to tie the projecting blocks to the body of the wall. The blocks *d* in (*b*) are designed to form a self-supporting arch, as shown at *g* in (*a*). To prevent any settlement of these blocks or opening of the joints between them, they are usually anchored to the steel members by means of small suspension rods shown at *f* in (*b*). The blocks *e* in (*b*) are likewise suspended from the steel member *a*. The diagonal lines show the backing, which consists of brickwork.

81. In addition to the general dimensions, the manufacturer's drawings usually indicate the size of the blocks, as shown in Fig. 28 (*a*). When these scale drawings have been approved by the architect, the manufacturer proceeds to lay out the details of the various blocks. When the blocks are all made and fitted, a letter and a number are marked on the back of each for the

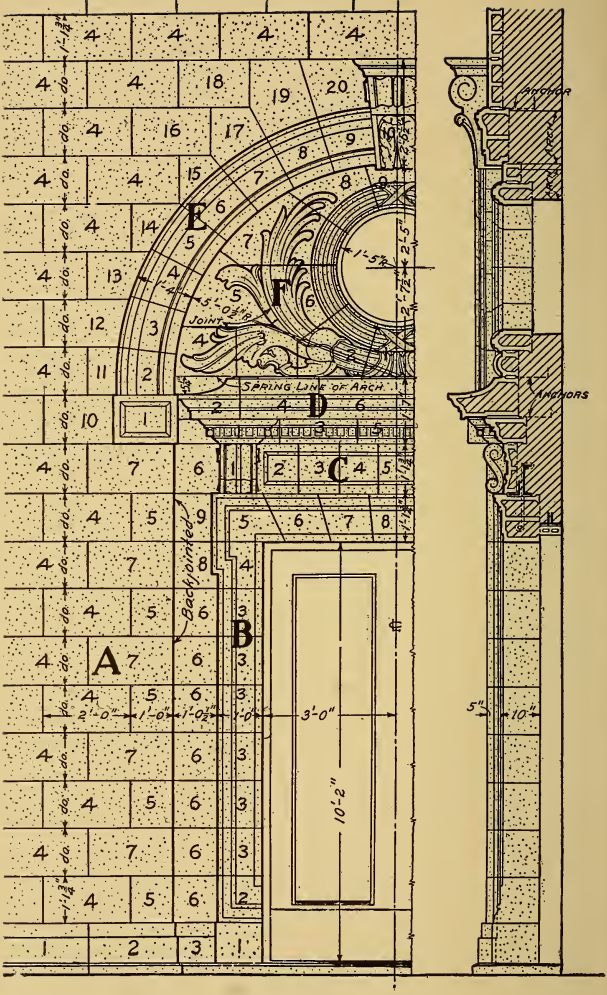

A
B
C
D
E
F
Backjointed
SPRING LINE OF ARCH
JOINT
ANCHOR
ANCHORS
2'-0"
1'-0"
1'-0½"
1'-0"
3'-0"
10'-2"
5"
10"

Fig. 79

convenience of the setter. The number corresponds with the location of the piece in the design, as indicated in Fig. 29, which is called a *setting plan,* or *setting drawing.* The different groups are lettered *A, B, C, D, E,* and *F,* but all similar blocks have the same number. Thus, all the blocks marked *A5* are in group *A* and are of the same size and pattern, and all blocks marked *B3* are of the same size and pattern. Any block marked *A4* can be taken from the pile and placed in any position marked *4* in the *A* section of the setting drawing.

STEEL

82. Construction.—Buildings of considerable height usually have a steel frame, which must be covered with masonry to protect it from the weather and from fire. The architect prepares the plans for a building, which show the location of doors, windows, etc., and also locates a steel framework to carry the entire building. The steel frame is then carefully designed by an engineer, special attention being given to strength and economy.

The frame of a steel-skeleton building consists primarily of a system of columns, with girders, beams, trusses, etc., between which or upon which the floors and roofs are built. In some cases the girders at each floor carry the masonry of the wall construction enclosing that floor.

83. The columns, girders, trusses, etc., are built up of structural shapes, known as I's, or I beams; L's, or angles; T's, or tees; channels, plates, bars, and rods. These shapes are built into columns, girders, trusses, etc., in the shop, after which they are assembled at the job to form a rigid framework.

84. Structural shapes are designated as to their size in inches, as 4″, 6″, 9″, etc., the dimensions referring to the depth, or largest dimension, of the shape. This dimension is frequently accompanied by a number indicating the number of pounds to the linear foot of the shape. Thus the marking *9″-I-21#* means an I beam, 9 inches in depth and weighing

21 pounds for each foot in length. The dimensions, weights, and other properties of shapes are standardized, and are given in handbooks issued by the leading steel companies.

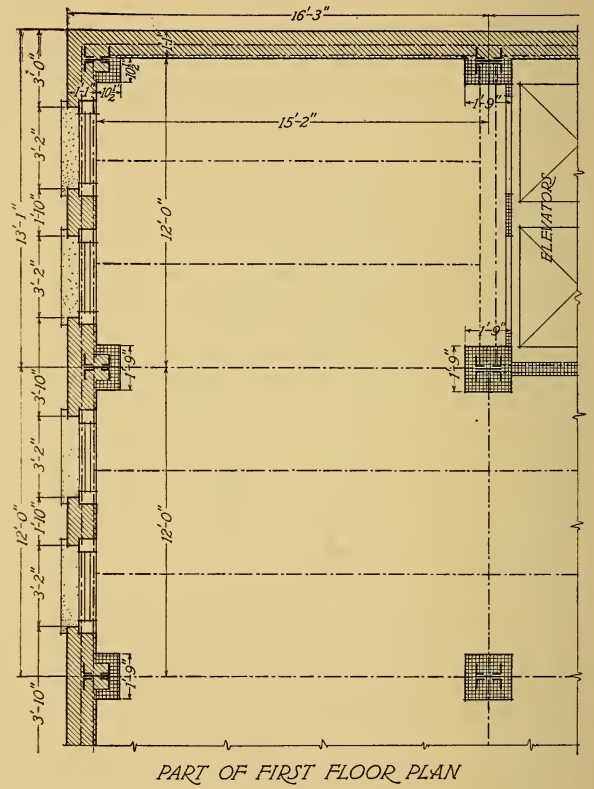
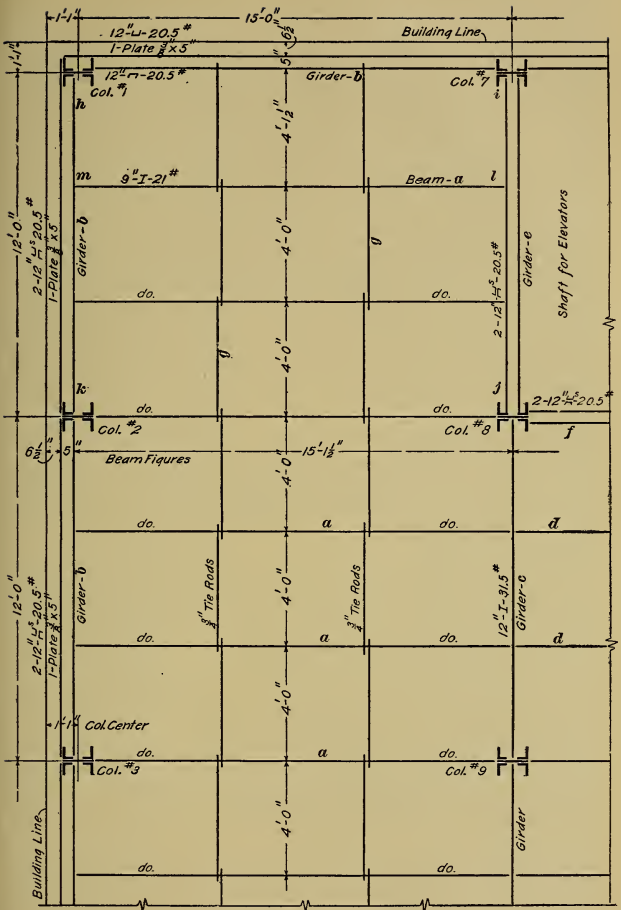


FIG. 30

85. Example of an Architect's Drawing.—In Fig. 30 is shown a typical plan of a corner of a steel-frame building,



Part of Floor Framing Plan

FIG. 31

the outside walls being brick, and the columns being covered with hollow tile and brickwork. The architect shows in his drawing only the indications of the columns which are accurately designed later on. The beams and girders used in the floor construction are not shown usually, although they are sometimes indicated by dot-and-dash lines, as in this illustration.

86. Example of Steel-Framing Plan.—In Fig. 31 is shown the framing plan for the same portion of the building shown in Fig. 30, the several columns being numbered for further reference. Drawings of this kind are generally prepared by engineers who specialize in this kind of work. No attention is paid in this drawing to the doors and windows, as there is no steel work in connection with them. Every beam is indicated as to its depth, and the weight per foot is also given, which describes the beam positively. Distances are given to column centers and to the centers of the beams and girders. The framing around the elevator shaft is shown, and this must correspond with the architect's design and the dimensions on the general plans.

The detail drawings of all the steel framing shown on this drawing are generally made by draftsmen employed by the contractor who erects the frame. These are submitted to the engineer and the architect for approval.

The columns are built from a plate and four angles riveted to it, and each column is numbered, as shown on the plans, for identification when it reaches the building. The floor construction consists of 9-inch I beams, weighing 21 pounds per linear foot, marked *a* and *d*, and are supported by girders in the outside walls and between the columns. The girders *b* each consists of a $\frac{3}{8}'' \times 5''$ plate and two 12-inch channels, as marked on the plans. Around the elevator shaft 12-inch channels are used to form the girders *e* and *f* which frame the opening and support the floor construction. Between the columns in the interior of the building are girders *c* consisting of 12-inch I beams. Tie-rods *g* are used to brace the floor beams, and to prevent the beams from spreading when the floor tiles are put in place.

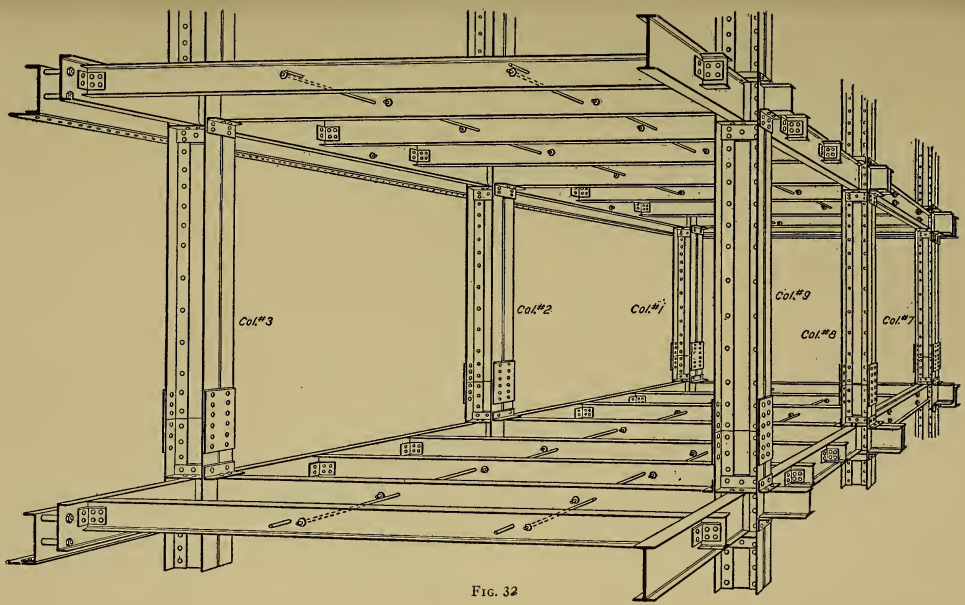


FIG. 32

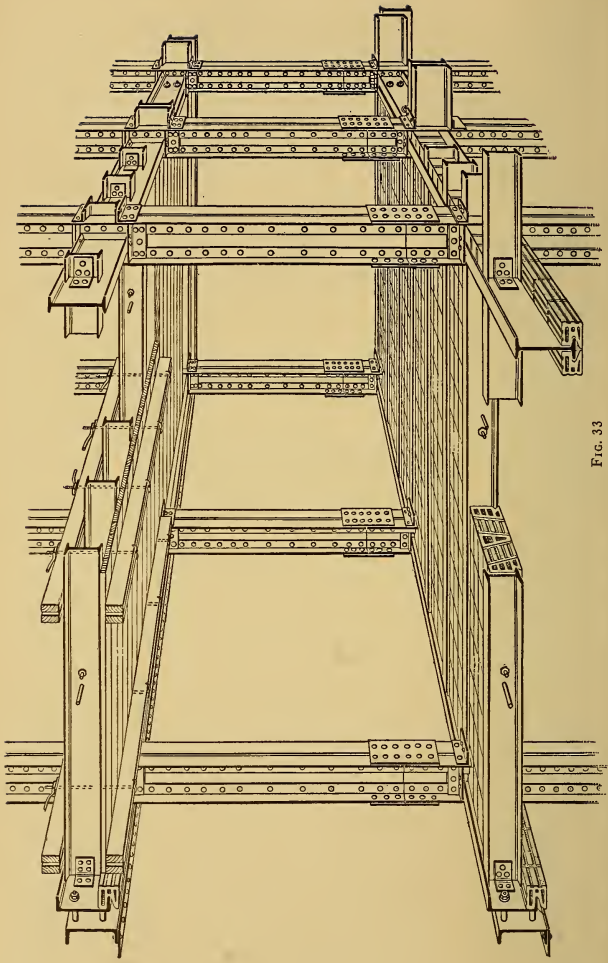


FIG. 33

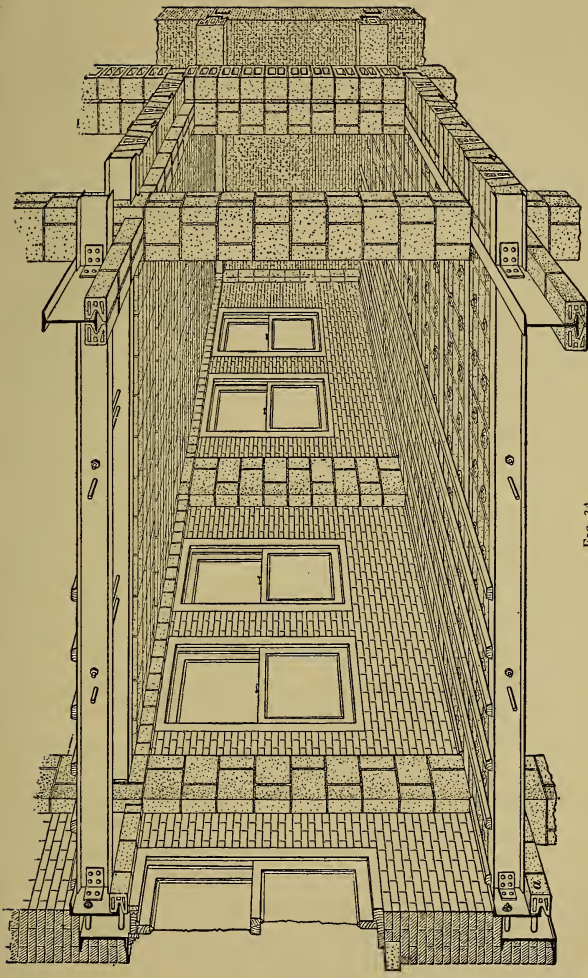


Fig. 34

274—5

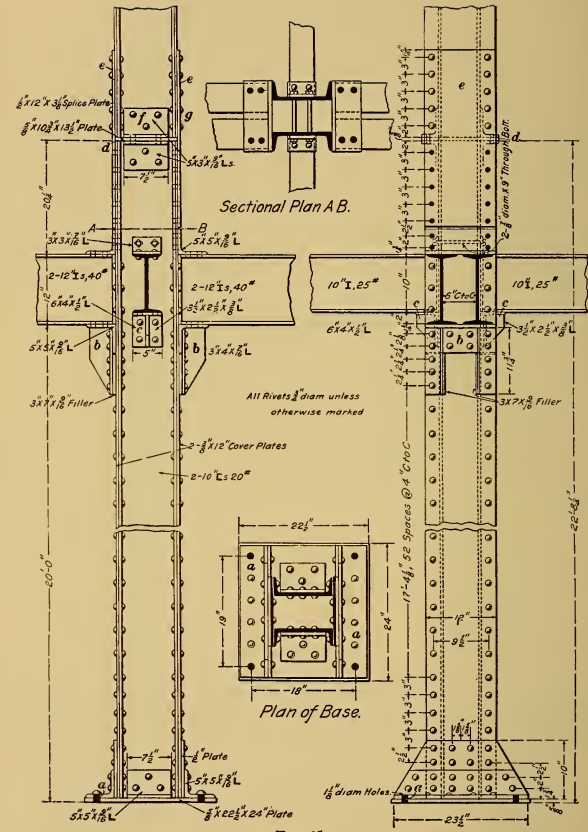

Sectional Plan A B.
Plan of Base.
All Rivets ¾" diam unless otherwise marked
52 Spaces @ 4" c to c
1" diam I.B. Through Bolt
1⅛" diam Holes

FIG. 35

87. In Fig. 32 is shown a view of the steel work for the building shown in Figs. 30 and 31, before any of the fireproofing, walls, or floors, are started. In Fig. 33 the floor arches are in place, as well as the protection for the bottoms of some of the girders. The centering that supports the upper floor is shown. In Fig. 34 is shown the same building with the walls completed, the column fireproofing and the hollow-tile flooring in place, the sleepers ready for concrete filling and flooring, and the walls ready for plastering.

88. Typical Column Details.—In Fig. 35 is shown a typical detail drawing of a column such as is used in buildings similar to that shown in Fig. 34. Such a drawing would be made by the contractor. This column consists of two 10-inch channels, to which are riveted $\frac{3}{8}'' \times 12''$ cover plates, making a box-like column about 12 inches square. The base of the column is built out to make a $22\frac{1}{2}'' \times 24''$ base, the four corner holes being left open, as indicated by their being shown black, so as to allow for bolting the base to a masonry foundation.

On two sides of the column are knees, or brackets *b*, each of which supports two 12-inch **I** beams, while on the other two sides are smaller brackets *c*, each supporting a 10-inch **I** beam. The column is shown to be 22′ $8\frac{1}{4}''$ long, and a bedplate *d* with splice plates *e* and angles *f* connects this section of the column to the section above it, making the column continuous throughout its height. The joint is usually made just above a floor line, as at *g*, so as to avoid complicated framing at the floor level.

89. As all of the steel work for a building must be detailed in this manner before the actual work of fabrication can commence, it is evident that the drawings must be accurately made, and care must be taken in the preparation of the material in the shop.

All of the drawings of the steel work are submitted to the architect and the engineer for their approval before the work of fabrication is commenced. The architect checks such dimensions as column centers, story heights, etc., in order to see that there is ample room for the design of the building to be carried

out, and to permit the workmen of different trades to do their work. The engineer examines the drawings to see that the joints are properly designed for strength.

CONCRETE

90. Representation of Concrete Construction. Architect's drawings for concrete buildings, which may be of concrete blocks, monolithic concrete, or reinforced concrete, differ from drawings for buildings made of stone, brick, or tile, only in the indication used to represent the materials. A concrete wall is shown in Fig. 36 (*a*), and a portion of a concrete wall with a reinforced-concrete column is shown in Fig. 36 (*b*). The method of representing concrete is shown in Fig. 11, at *c* in section and at *o* in elevation. No indication is used on plans to represent plaster on the inside, unless the wall is furred and lathed, when an additional line is shown, as already described for other forms of masonry walls. The nature and amount of reinforcement are seldom stated on the general plans, such as Fig. 37, which are made by the architect; but the reinforcement is shown on the scale details or on special drawings for the concrete work. In many cases the architect employs a concrete engineer to prepare the drawings showing this work.

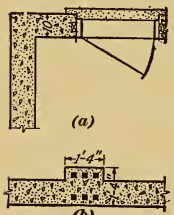


FIG. 36

91. Example of a Working Plan for a Reinforced-Concrete Building.—An example of a portion of a plan prepared by a concrete engineer is shown in Fig. 38. This plan shows the concrete construction required for the architect's plan shown in Fig. 37, and is to be used as a working drawing for the concrete work only. On this drawing the various columns, girders, beams, etc., are shown, each being numbered so that it may be identified in accompanying schedules, such as are shown in Fig. 39 (*a*) and (*b*). For convenience in identifying the structural members in Fig. 38, the girders are indicated by the

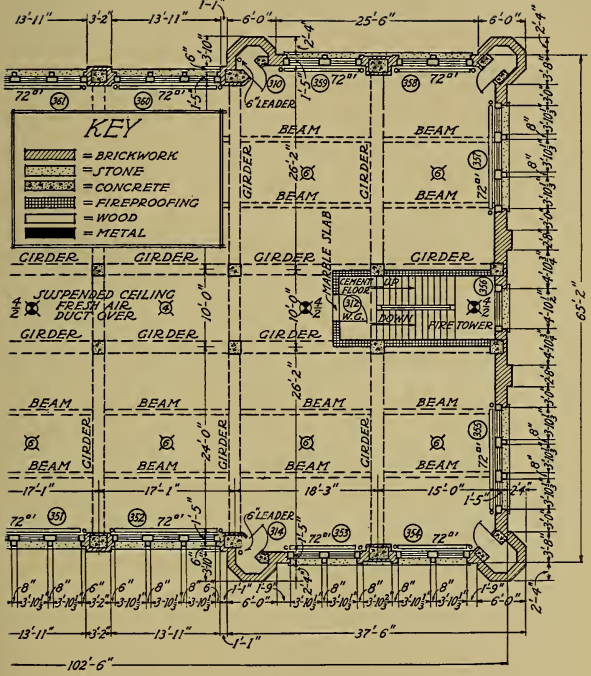

KEY
= BRICKWORK
= STONE
= CONCRETE
= FIREPROOFING
= WOOD
= METAL
SUSPENDED CEILING
FREE AIR DUCT OVER
GIRDER
BEAM
MARBLE SLAB
CEMENT FLOOR
UP
DOWN
W.C.
FIRE TOWER
6" LEADER
13'-11"
3'-2"
13'-11"
1'-1"
6'-0"
25'-6"
6'-0"
72'0"
26'-2"
10'-0"
24'-0"
17'-1"
18'-3"
15'-0"
1'-5"
2'-4"
65'-2"
37'-6"
102'-6"

FIG. 37

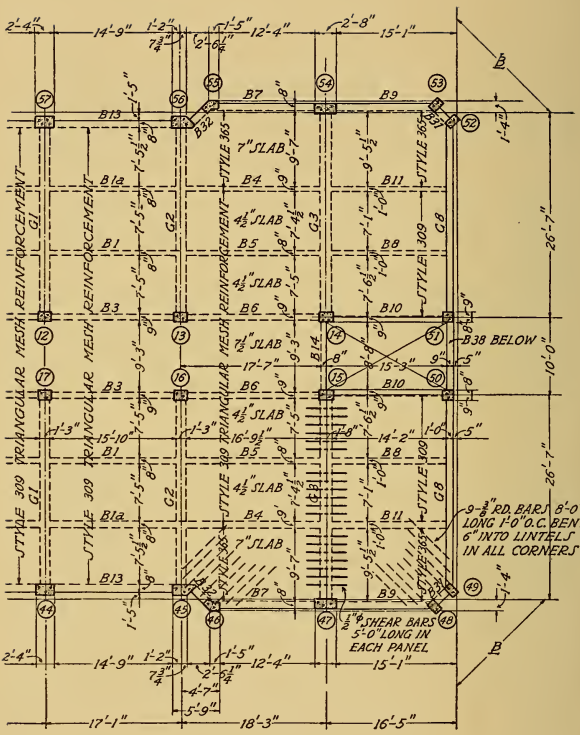

2'-4"
14'-9"
1'-2"
7¾"
1'-5"
12'-4"
2'-8"
15'-1"
2'-0¼"
B
A
57
56
55
54
53
52
B13
B12
B7
B9
1'-5"
1'-5½"
8"
7" SLAB
STYLE 365
9'-5½"
1'-4½"
B1a
B4
B11
4½" SLAB
STYLE 309
G8
26'-7"
G1
G2
G3
B1
B5
B8
7½" SLAB
B38 BELOW
B3
B6
B10
12
13
14
51
17'-7"
15'-3"
10'-0"
17
16
15
50
B14
16'-9½"
14'-2"
1'-3"
15'-10"
1'-0"
5"
9-⅝" RD. BARS 8'-0" LONG 1'-0" O.C. BENT 6" INTO LINTELS IN ALL CORNERS
B13
B12
B7
B9
49
44
45
46
47
48
1'-4"
⅝" SHEAR BARS 5'-0" LONG IN EACH PANEL
4'-7"
5'-9"
17'-1"
18'-3"
16'-5"

FIG. 38

Beam Schedule – Second and Third Floor

Mk.	Tl. N°	Size a	Size b	Size c	Size d	Reinforcement DB	Reinforcement Straight	Reinforcement Stirrups	Reinforcement Top Steel	Sk. N°	Near Col.	Remarks
B1	12	8"	2'-0"	4½"	4½"	1-1"Sq.	1-1"Sq.	12-⅜"Rd.		1	25-35	
B1a	12	8"	2'-0"	4½"	5½"	1-1" Sq.	1-1"Sq.	12-⅜"Rd.		1	25-35	
B2	8	8"	1'-7"	5½"	0	1-1" Sq.	1-1" Sq.	12-⅜"Rd.		2	34-35	
B3	12	9"	2'-0"	4½"	7½"	1-1⅛"Sq.	1-1⅛"Sq.	12-⅜"Rd.		1	24-25	
B3a	2	9"	2'-0"	4½"	7½"	2-1" Rd.	2-1" Rd.	12-⅜"Rd.		1	23-24	
B4	4	9"	2'-0"	7"	4½"	2-1" Rd.	2-1 Rd.	14-⅜"Rd.		1	28-32	
B5	4	8"	2'-0"	4½"	4½"	2-⅞" Rd.	2-⅞" Rd.	14-⅜"Rd.		1	28-32	
B6	4	9"	2'-0"	4½"	7½"	2-1" Rd.	2-1" Rd.	14-⅜"Rd.		1	27-28	
B7	4	8"	1'-7"	7"	0"	2-¾" Rd	3-¾" Rd.	12-⅜"Rd.	2-⅜" Rd. Rods in Top of all Beams	4	30-31	
B8	4	1'-0"	1'-6"	4½"	4½"	2-1" Rd.	2-1" Rd.	12-⅜"Rd.		1	73-30	
B9	4	8"	1'-7"	7"	0"	2-¾" Rd.	2-¾" Rd.	12-⅜"Rd.		4	29-30	
B10	4	9"	2'-0"	4½"	0"	1-⅞" Rd. 1-1" Rd.	1-⅞" Rd. 1-1" Rd.	12-⅜"Rd.		1	1-72	

(a)

Girder Schedule – Second and Third Floor

Mk.	Tl. N°	Size a	Size b	Size c	Size d	Reinforcement DB	Reinforcement Straight	Reinforcement Stirrups	Reinforcement Top Steel	Reinforcement Shear Bars	Sk. N°	Near Col.	Remarks
G1	12	1'-3"	2'-8"	4½" 5½"	4½" 5½"	4-1⅛" Sq.	4-1⅛" Sq.	18-⅜" Rd.	2-⅜" Rd.	18-½" Rd.	1	33-26	See Sk. 10 Sh. 3
G2	4	1'-3"	2'-8"	4½" 7"	4½" 5½"	4-1⅛" Sq.	4-1½" Sq.	18-⅜" Rd.	4-⅞" Rd.	18-½" Rd.	1	27-32	
G3	4	1'-6"	2'-8"	4½" 7"	4½" 7"	5-1⅛" Sq.	5-1⅛" Sq.	20-⅜" Rd.	5-1" Sq.	18-½" Rd.	1	28-30	
G4	2	1'-3"	2'-8"	4½" 7"	0 5½"	3-1⅛" Sq.	4-1⅛" Sq.	18-⅜" Rd.	4-1" Sq.	18-½" Rd.	1	23-36	
G5	2	1'-3"	3'-2"	6" 6½"	4½"	3-1⅛" Sq.	4-1½" Sq.	18-⅜" Rd.	4-1" Sq.	18-½" Rd.	1	22-31	
G6	2	1'-0"	2'-4"	0	4½"	2-1⅛" Sq.	2-1⅛" Sq.	14-⅜" Rd.	2-⅜" Rd.	18-½" Rd.	1	62-72	
G7	2	1'-3"	2'-8"	4½" 5½"	4½"	1-1⅛" Sq.	1-1⅛" Sq. 1-⅞" Rd.	14-⅜" Rd.	2-⅜" Rd.	12-½" Rd.	6	63-66	
G8	4	8"	3'-6"	0	4½"	2-1⅛" Sq.	2-1⅛" Sq.	20-⅜" Rd.	3-1" Sq.	18-½" Rd.	3	73-74	

(b)

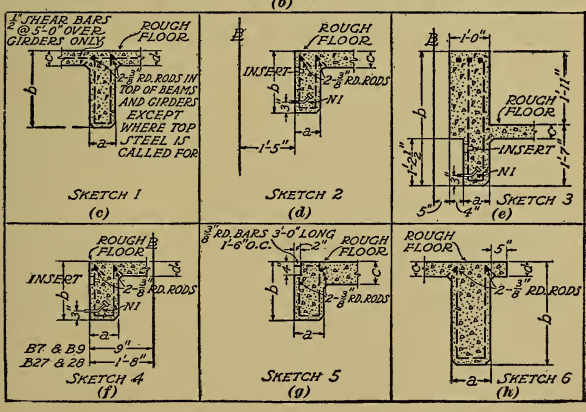


FIG. 39

letter *G*, and the beams by *B*, followed by suitable letters and numbers. The columns are marked by numbers in circles.

Sometimes the sizes of the beams and girders are placed on the drawings in connection with the structural members shown on the framing plan. In this case, however, the girders and beams are marked with letters and numbers as previously mentioned, and are described as in the schedules (*a*) and (*b*), Fig. 39. Consequently, all beams of the same size are marked with the same letter and number throughout the plans, and are described under the same letter and number in the schedule. Thus, when *G1* is found in the plan, a corresponding reference to *G1* will be found in the first column of the girder schedule. In this schedule will be given the total number of the girders marked *G1*, the sizes, reinforcement, the columns between which the girder extends on the plans, and a reference to a sketch which is a diagram showing the shape of the girder. In the case of girder *G1*, sketch *1* is indicated. This sketch is shown in Fig. 39 (*c*). It will be noted that there are letters *a*, *b*, *c*, and *d* in place of dimensions in this sketch. Under the heading *Size* in the girder schedules, opposite the letter *G1*, the dimensions corresponding to these letters will be found. For instance, the distance *a* in Girder *1* is 1′3″, the distance *b* is 2′8″, etc. The distances *c* and *d* show that the slabs on each side of this girder vary in size, and may be either $4\frac{1}{2}$ or 5 inches. The actual thickness at any given point can be determined from the plan. Under the head of Reinforcement in the girder schedule and opposite *G1*, will be found a list of the bars or rods which are required in the construction of this girder. Under the head *DB*, meaning *down bars*, there are 4 bars $1\frac{1}{8}$″ square; under *Straight*, 4 bars $1\frac{1}{8}$″ square, etc. This will give a sufficient idea of this method of indicating girders, beams, etc. The same explanation applies to the beam schedule. In the case of *B1*, *B1a*, *B3*, *B4*, *etc.*, sketch *1* is also applicable, and the dimensions are taken off in the same manner as with girders.

92. In the plan shown in Fig. 38, various kinds of mesh reinforcement are indicated, such as *style 309*, and *style 365*. Diagonal reinforcement is indicated at the corners near col-

umns, *45, 46, 48,* and *49*. Between columns *15* and *47* are shown heavy dash-and-dot lines, which indicate the tension members of the reinforcement used for the floor slabs. The diagonal cross lines between columns *14, 15, 50,* and *51* indicate an open space. By referring to the architect's plan, Fig. *37*, it will be seen that this space is occupied by a stairway. A careful study of these drawings will give a very clear idea of the methods of indicating construction and material on plans for concrete buildings.

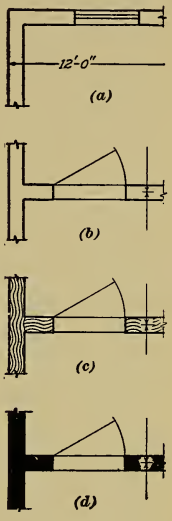


FIG. 40

FRAME BUILDINGS

93. Frame Walls.—Frame walls are built usually with either 2″×4″ or 2″×6″ studs. On the outside of these studs, when siding is used, a surface of sheathing boards about 1 inch thick is placed, over which the finished siding is laid. On the inside of the building, the thickness of the plaster, including the lath, is a little less than 1 inch. The thickness of the wall when 2″×4″ studs are used, will thus be between 6 inches and 7 inches, and between 8 inches and 9 inches when 2″×6″ studs are used. Thus, in Fig. 40 (*a*) the frame wall is shown about 7 inches thick, at the $\frac{1}{4}$-inch scale indicating that 2″×4″ studs are used with sheathing and siding on the outside and plastering on the inside. The thickness of frame walls is seldom given on drawings, as it may vary somewhat on account of variation in the thickness of the materials, as just mentioned. The dimensions are, therefore, taken to some fixed point, such as the outside of the studs or the outside of the sheathing. There is a variation in practice among architects with respect to the point to which such measurements are taken. To determine which is used, the overall dimension of one side of the basement plan and

the corresponding dimension of the first-floor plan should be compared, and if they are alike the architect has probably taken his distances for the first-floor plan from the outside of the sheathing. If, however, the dimension in the first-floor plan is 2 inches less than in the basement plan, the architect has taken his dimensions from the outside of the studs.

94. The building shown in the blueprints which accompany this Section has an outside covering of stucco. In this construction, the studs are first sheathed with 7/8-inch sheathing over which furring strips are placed and to which metal lath is applied. The surface of stucco brings the total construction to a thickness of $2\frac{1}{2}$ inches outside the studs. As it is clear from the elevations and scale drawings, that this construction is carried out over the entire building, there need be none of this detail shown in the general plans and sections, excepting the inside and outside lines of the walls. The measurements of the frame of this building are taken from the outside of the studs and, therefore, are 5 inches smaller in each direction than the basement walls.

95. Partitions, or Inside Walls.—Frame partitions are built up usually of 2″×4″ studs with lath and plaster on both sides, making a total thickness of $5\frac{1}{4}$ inches to 6 inches, depending on the width of the stud and the thickness of the plaster. Such partitions are, however, shown on the plans as being 6 inches. The dimensions which locate the partitions are given usually to the centers of the partitions, which will be the center of the studs, and any difference in thickness is, therefore, divided between the rooms on both sides of the partitions, without materially affecting their size or proportions. Such a partition is indicated in Fig. 40 (*b*).

96. Sometimes, to save room, a partition is erected with the studs flatwise, so as to take up only 2 inches in the thickness of the wall, making a partition somewhat less than 4 inches thick. Such a partition is shown at *d* on the blueprint of the First Floor Plan. This construction may be used where no weight comes on the partition or where the partition is short, as between closets. When studs are set flatwise the thickness of the par-

tition should be especially marked on the plan, as at *d*. In other cases, the partition is made thicker, as at *e*, in order to continue the thickness of the partition at the colonnade between the hall and the living room, or to accommodate sliding doors, as at *f* between the hall and the dining room. In such cases it is customary to place a row of studs for each side of the partition, and the partitions are measured to the outside edge of the studs, and sometimes to the finished plaster surfaces. In other cases, as at *g*, the partition is made thicker to cover large pipes or other work in the partition. In this case there is a 4-inch soil pipe, having an outside size of $5\frac{1}{2}$ inches in the partition. A 2-inch vent or waste pipe, being only $3\frac{1}{2}$ inches over all, will readily be concealed in a $2'' \times 4''$ stud partition.

97. Walls and partitions of wood-frame construction are indicated usually with the interior spaces entirely blank, as in (*a*) and (*b*), Fig. 40, or with wavy lines, as in (*c*). Some architects shade or darken the walls, as in (*d*), so that they will appear in a lighter blue color, or entirely white, in the blueprints. Formerly it was the custom to color these spaces to represent the various materials, as already mentioned, but this custom has gone out of use, as the method of producing blueprints makes it advisable to make all the indications so that they can be reproduced by blueprinting.

98. Floors and Roofs.—Floors and roofs have their construction shown in the sections, or in the scale details. When the section is taken at right angles to the joists, the joists are shown in section with a notation of the size of the joists and their spacing on centers, as at *g* in the blueprint of the Transverse Section. The side view of the bridging is shown between the joists. When the section is taken lengthwise of the joists, ceiling beams, or rafters, the space occupied by them has usually a notation regarding the size and centering, the same as when the joists are at right angles to the section. An example of this is shown at *d* in the Longitudinal Section. Where bridging occurs, it is shown as vertical parallel lines, as at *e*. The size, direction, and spacing of the joists are generally indicated on the floor plans by arrows, as shown on the blueprint plans.

Rafters are sometimes shown as at *f* in the Longitudinal Section.

99. Brick-Veneered Walls.—Brick-veneered walls consist of a sheathed wooden frame, outside of which is a 4-inch facing of brick. The general construction of such a wall is shown in perspective in Fig. 41. The frame wall occupies a space of 6 inches, including the sheathing and the inside plas-

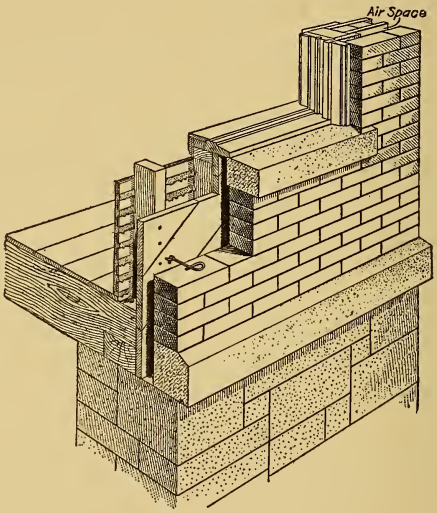


FIG. 41

tering. The brick is placed with a 2-inch air space between it and the sheathing, making a total thickness of about 12 inches. The frame for supporting the brick veneer is sometimes made of 2″×6″ studs, in which case the wall will be 2 inches thicker than shown, or about 14 inches over all, of which thickness the frame wall occupies 8 inches. For very cheap work the sheathing is sometimes omitted, the brick wall being anchored to the edges of the studs, but this construction is not to be recommended.

Brick-veneered walls are shown in plan in Fig. 42, in which *a* is the brick veneer, *b* is a 2-inch air space, and *c* is a frame wall consisting of 2″×4″ studding with sheathing boards on the outside, and lath and plaster on the inside, the construction being the same as shown in Fig. 41.

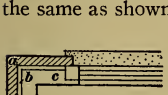


FIG. 42

100. A brick-veneered wall is similar in appearance to a solid brick wall, and any of the face bonds shown in Fig. 21 may be used in brick-veneered work.

Dimensions for brick-veneered walls are given usually to the outside face of the brick, and the studs must be kept back a sufficient distance to allow for the brickwork, and for the air space between the brick and the sheathing.

OPENINGS IN WALLS AND PARTITIONS

101. Plain Openings.—Plain openings that are similar to door openings are shown in plan as in Fig. 43 (*a*) and (*b*). Such openings have a portion of the wall extending across the top, which is indicated by broken lines. An opening of this type may be finished in plaster all around, or it may be finished with wooden jambs and trim like an ordinary door. When trimmed with wood, the opening is sometimes marked *Cased Opening*, as in (*a*), and when the top, or head, is arched, it is marked *Arched Opening*, as in (*b*).

DOORS

102. Common Swinging Doors.—In Fig. 43 (*c*) is an indication of a single swinging door in a stud partition. The slanting line *a* or a line *b* shows the door and indicates on which side of the opening the door is hung. As a rule, the finished dimensions of the door are marked on it, the width being marked first and then the height, and sometimes the thickness. The door is occasionally numbered, as indicated in the figure, for

reference in the specifications, or in large-scale details. A method of numbering doors is indicated in Fig. 37. In this example, the numbers are placed in circles, as close to the doors as possible. Each of these numbers begins with a 3, which indicates that the door is on the third floor of the building.

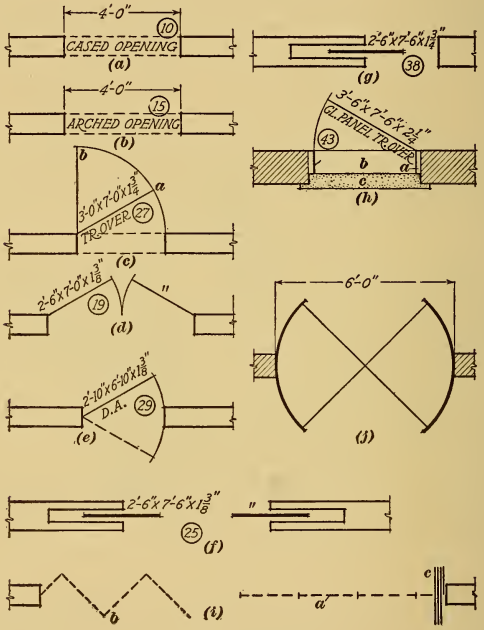


FIG. 43

The manner of indicating a common swinging door in elevation is shown at *h* in the blueprint of the Transverse Section.

103. Transoms.—Doors sometimes have openings above them called *transoms,* in which are sash or panels that can be opened separately for ventilation. In hotels and other places

the transom is sometimes made with a wood panel, so as to prevent observation through it, while in others the panel is glazed for lighting the corridor. The customary method of indicating a transom over a door is to use the abbreviation *Tr.* or *Tr. Over* on the plan as in Fig. 43 (*c*). The details of these transoms are generally shown on the scale details.

104. Double Doors.—An opening may be closed by a pair of doors hung from the two jambs as in Fig. 43 (*d*). Usually the size is marked on one door only, as the doors are of the same size. In some cases a ditto mark (") is used to indicate that the doors have the same dimensions.

105. Double-Acting Door.—An indication of a double-acting door is shown in Fig. 43 (*e*). The letters DA are frequently omitted. This door swings in either direction through the opening and is generally controlled by a spring that holds the door, while at rest, in a closed position in the opening. In the blueprint of the First Floor Plan two such doors are shown leading out of the pantry. Double doors may be double-acting also, that is, both doors may swing back and forth through the opening.

106. A Double-Sliding Door.—A double-sliding door is indicated in Fig. 43 (*f*). The partition, which is a stud partition, is made about 11 inches in thickness to accommodate the sliding doors, and the doors slide into pockets that are formed in these partitions. The doors between the dining room and the hall in the blueprint of the First Floor Plan are sliding doors, and the method of showing this indication is quite clear. As with other doors, the sizes of the individual doors are marked on the drawing. A single sliding door is like one of a pair of sliding doors and is indicated as in Fig. 43 (*g*).

107. Door in a Masonry Wall.—A door in a brick or other masonry wall is indicated as in Fig. 43 (*h*). This indication shows the door jambs at *a*, the wooden sill at *b*, and a stone or cement sill at *c*.

The numbers in the circles at most of these doors are used when the doors are numbered on the plans.

108. Accordion Door.—An accordion door, such as is used between lecture rooms, etc., is shown in Fig. 43 (*i*). This door consists of a number of leaves hinged together and supported on pivoted rollers or hangers moving along an overhead

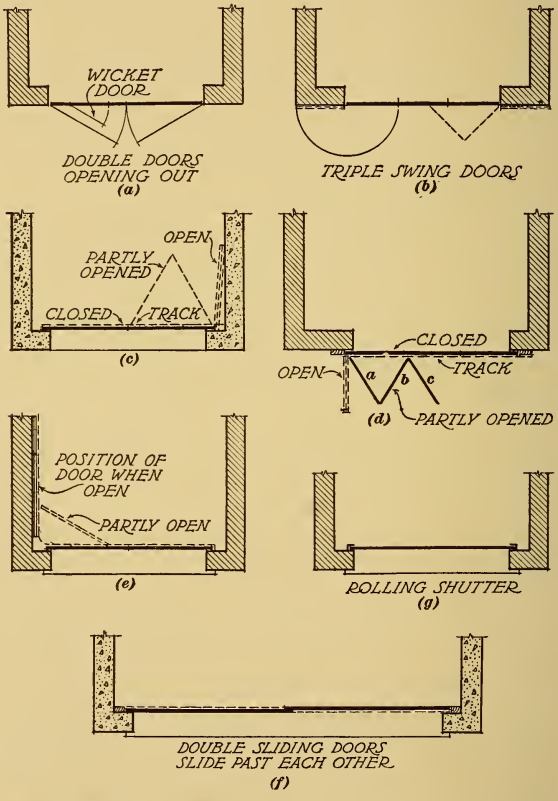


FIG. 44

track. In some cases the doors are used in two groups to meet in the center of the opening. When closed, this type of door presents a plain paneled surface, and when open, folds close against the jamb of the opening in the wall or into a pocket. At *a*, the dotted line indicates the door as closed, the other half, as at *b*, being partly open. At *c* the door is shown opened and fitting close against the jamb of the opening.

109. Revolving Doors.—A revolving door, indicated as shown in Fig. 43 (*j*), is used at entrances to public buildings, where the doors are in constant use, and it is desired to prevent drafts and loss of heat.

110. Garage Doors.—Small or private garages may have doors of any one of many styles, depending on the space available for doors. Swinging doors usually open out, so as to economize space. Fig. 44 shows several methods of hanging doors.

In (*a*) is shown a double door opening out, each door being hinged to the jamb. A small door, called a *wicket door,* is built in the left-hand door. In (*b*) is shown a triple door, two of which are hinged to the jambs, while the center one may be hinged to either of the other doors. In (*c*) is shown a double door sliding on an inside track, the hangers being provided with swivels to permit the doors to fold up, as shown. In (*d*) is shown a triple door hung on the outside, two doors *a* and *b* sliding as in (*c*), the third door *c* being hinged to the middle door. In (*e*) the double doors are shown to slide around the corner to lie close against the side walls, requiring very little inside space. As shown in (*f*), the doors for a double garage slide past each other, so that either half of the front may be opened. This method is suitable for double garages where both doors need not be open at the same time. In (*g*) is shown a rolling steel shutter which slides in grooves on the jambs, and rolls up into a metal casing above the door.

Still other devices are available for particular situations, and most of them are patented. The particular kind of door used should be clearly specified and the drawing should show that the proper construction has been provided to receive the door.

WINDOWS

111. In Fig. 45 are shown indications of different types of windows as they appear on plans and sections. Windows are often numbered on the plans in the same manner as are doors, the numbers being placed in circles, as close to the windows as possible. This method of numbering is shown in Fig. 37. In

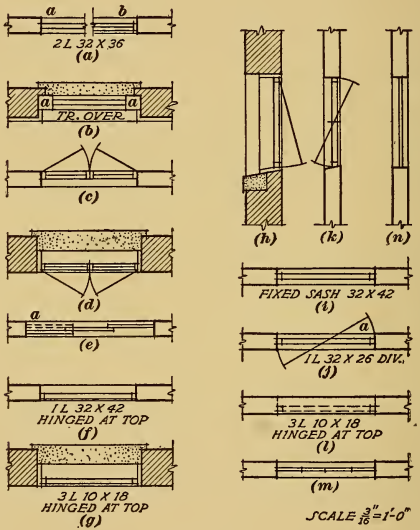


Fig. 45

this case each of the numbers begins with a 3, which indicates that the window is on the third floor of the building.

112. Double-Hung Windows.—In Fig. 45 (*a*) is an indication of a double-hung window in the outside wall of a frame building. The sash may be shown as at *a*, or as at *b*. Indications of such windows can be found on the blueprints of the Plans, and the appearance of the exterior of such windows

can be seen in the corresponding parts of the Elevations. The interior appearance of these windows is shown in the Sections. Either the size of the sash opening or the size of the glass may be shown, the custom varying in different parts of the country. In the blueprint of the South Elevation, the sizes of the openings are shown; in Fig. 45 (*a*) the method showing the size of the glass is used, and the marking gives the number of lights and their size, the width of the light being given first.

113. Double-Hung Windows in a Masonry Wall. In Fig. 45 (*b*) is an indication of a double-hung window in a brick wall. This indication is used with any masonry wall, the only difference being in the manner of indicating the material of which the wall is composed, as stone, tile, or concrete. Double-hung windows in masonry walls must be provided with boxes *a* to contain the weights that counterbalance the sash. To accommodate these boxes, a jog, or rabbet, is built into each jamb or side of the masonry opening, or else the frame is first set and the masonry built against it. The stone sill projecting at the top of the drawing shows that it is the outside of the wall. The inside of the wall is indicated by the line showing the furring and plastering.

114. Casement Windows.—In Fig. 45 (*c*) and (*d*) are shown casement windows, that is, windows that have pairs of sash that are hung at the sides like doors. The casement windows have their sills some distance above the floor line, somewhat similar to double-hung windows. The indication in (*c*) shows a casement window in a frame building, the sash being shown opening out of the room. In (*d*) is shown a casement window in a masonry wall, the sash being shown opening into the room.

115. French Windows.—French windows are windows having pairs of sash hung at the sides similar to casement windows, except that they extend down to the floor level, forming door-like features. French windows are shown in the blueprint of the First Floor Plan, at the opening from the living room to the side porch, and from the dining room to the breakfast porch.

On the blueprint they are marked *Doors*. The indications are the same as for casement windows.

116. Sliding-Sash Windows.—Sash that slide horizontally are sometimes used, as in sleeping porches, when it is desired to open more than half of the window space. A method of indicating such a window is shown in Fig. 45 (*e*).

117. Single-Sash Windows.—When the opening is not large enough to permit the use of double-hung or casement sash, single-sash windows are used. These windows may be hinged at the side, top or bottom, and are indicated in plan as in Fig. 45 (*f*) when in a frame wall, and as in (*g*) when in a masonry wall. In (*h*) is shown a vertical section of the window shown in plan in (*g*), the sash being hinged at the top. When the sash is hung from the top, bottom or sides, the drawing should be marked *hinged at top*, etc., as the case may be. Single sash are generally shown close to the inside of the wall, and are very commonly used in basements of buildings.

118. Single-sash windows may also, if desirable, be fixed so as not to open. In such cases, it is customary to mark them *fixed sash* as in Fig. 45 (*i*). Single sash are very frequently pivoted so as to swing either horizontally or vertically on pivots placed at the middle of the sash. When pivoted on a vertical axis, they are indicated in plan as in (*j*). When pivoted on a horizontal axis, they can be shown in section as in (*k*).

119. Single-sash windows are frequently placed high up in the wall, so that a piece of furniture can be placed against the wall under them, or so that people cannot look through, but at the same time the window can be used to ventilate the room. The sash is then shown dotted, as in Fig. 45 (*l*). Such windows are shown in the kitchen in the blueprint of the First Floor Plan, the window being placed high up, as shown at *i* in the Transverse Section, so that servants cannot look out on the rear porch, and so that a table may be placed against the wall below the window.

120. Single sash are sometimes used as transoms over windows in outside walls, in which case the indication appears with

an added notation, giving the size of the glass or such information as will lead the contractor to examine the elevations or specifications. An indication of a transom is given in Fig. 45 (*b*).

121. Interior Sash.—Interior partitions are sometimes constructed with sash for lighting corridors or other parts of a building. Such a partition is indicated on the plans in the manner shown in Fig. 45 (*m*) and in section as in (*n*). Partitions of this nature are usually detailed, in order to show the mouldings and the sizes of glass.

122. Blinds.—Windows are sometimes equipped with blinds, or shutters, hinged at the sides of the frame, as shown on the blueprint of the South Elevation, at *j* and *k*.

FIREPROOF WINDOWS

123. As a protection against fire, windows for industrial buildings or in places where there is an unusual fire hazard, are often made of metal and glazed with wire glass. The design of the sash may follow closely the style of wooden sash, particularly if sheet metal is used, so the indication of the window on the plans will be similar to that already shown for wooden frames and sash. It is customary, however, to mark the window, so that its construction will be readily understood, with such words as *Metal Sash, Wire Glass,* etc., as in Fig. 46 (*a*), so as to identify it for further description in the specifications. An elevation of this type of window is shown in (*b*).

124. Steel Sash.—Some window openings, particularly very large openings, such as occur in large factory plants which require the maximum of light, are equipped with sash made of rolled-steel shapes and glazed with wire glass. These windows, or sash, may extend from floor to ceiling, and from column to column in the outside walls, as indicated in Fig. 46 (*c*), or the sash may extend in a practically unbroken surface from end to end of the building, as indicated in (*d*). Portions of the sash are made to swing or hinge for ventilation. These windows are

better shown on an elevation, as in (*e*), which shows the sash between columns as in (*c*). In (*f*), which shows an elevation of (*d*), the sash extends in a continuous line across the face of the columns. The portions shown with diagonal lines are hinged or pivoted. The glass used for this type of window is

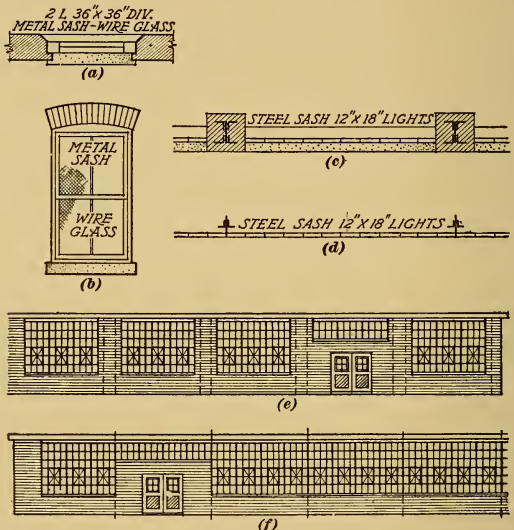


Fig. 46

usually 10″×16″, 12″×16″, or 14″×20″, although other sizes may be used when desired. Several patented types of these windows are available. The architect may show these windows in scale details, or he may depend on the general plans and a description in the specifications.

READING ARCHITECTS' BLUEPRINTS

1842B (PART 2) Edition 1

INDICATIONS USED IN DRAWINGS
(Continued)

INDICATIONS OF INTERIOR WOODWORK

VARIOUS FEATURES

1. Finish or Trim.—Interior woodwork consists of the woodwork used to finish or trim the building, and includes base, chair rail, picture molding, etc. It consists of thin strips of wood molded into pleasing shapes, and is often not more than 1 inch in thickness. For this reason it is seldom shown or indicated on the floor plans, but it is seen in sections where the broad faces of the work are exposed. Thus, in the blueprint* of the First-Floor Plan, there are no indications of base or picture molding, although they appear at *g* and *h* in the Longitudinal Section. Interior woodwork consists largely of molded surfaces, and the outlines of these moldings are shown in section on the scale details or full-size details, as was illustrated in Fig. 4 of *Reading Architects' Blueprints*, Part 1. The kind of wood, and other information, is given in the specifications.

*As occasion requires, reference will be made to the set of blueprints of a dwelling furnished with *Reading Architects' Blueprints*, Part 1. The same references will apply to the corresponding set of plates that are bound in this Part.

2. Doors.—Doors are shown on general plans by heavy lines, as already described, or they may be shown on elevations as in the blueprint of the South Elevation, at *l*, or in sections, as at *h* in the Transverse Section. The doors may be shown on scale details and parts of doors may be shown on full-size details.

3. Built-In Features.—Work in the nature of book cases, mantels, kitchen and pantry dressers, etc. is frequently made to be fixed in place in the building. Such work may be made more or less completely in the shop, and then erected in place. These features appear on the general plans, as at *h*, *i*, and *j*, in the blueprint of the First-Floor Plan, and scale details are made to guide the contractor and the workmen. In some cases, working drawings are made by the carpenter contractor. The same method is followed with colonnades, arches, and similar work. Scale details showing interior woodwork are shown in Figs. 3 and 4 of *Reading Architects' Blueprints*, Part 1, and further descriptions of this kind of work will be found in Part 3 of the same subject, which follows this Section.

STAIRS

4. General Considerations.—More mistakes are made in the drawing and arranging of stairs than of any other part of the building. It is, therefore, very important to be able to determine from an inspection of the plans whether sufficient space has been allowed for the stairs. This space should be sufficient to accommodate a series of steps of such a size as to be comfortable for ordinary use, and also so arranged that the distance between any step and the construction above the steps will be sufficient so that an adult walking up or down the stairs will not come in contact with the overhead construction.

5. Headroom.—The distance between the steps and the construction directly over them is known as *headroom*, and should not be less than 7 feet. The subject of headroom

is illustrated in Fig. 1, where a flight of stairs is shown in section. The floor construction *a* extending over the lower steps is called the *header*, and the steps consist of *treads b* and the *risers e*. At no point should the headroom be less than shown between the tread *b* and the overhead part *a*. If the construction *a* were to extend further over the stairs below

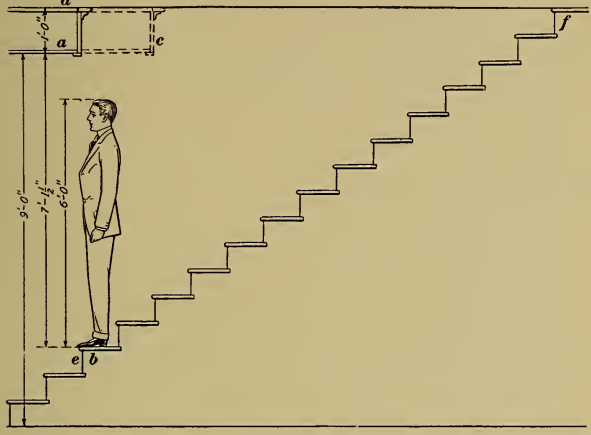


Fig. 1

as at *c*, it would be impossible for a person to walk up or down these stairs without stooping or striking the construction above.

It will be seen in Fig. 1, that if the ceiling height is 8 feet 10½ inches, the stairs cannot extend more than three risers under the header *a* before the minimum headroom is obtained. The header must always be located at a sufficient distance horizontally from the top riser *f* so that the vertical distance between the header *a* and the tread directly below it, as at *e*, will be not less than 7 feet. If the height of the risers is known, it is possible to determine over which riser there will be such headroom and the header can be located accordingly.

The number of such risers, counted from the top, may be found by the following rule:

Rule.—*To the proper headroom, 7 feet, add the thickness of the floor construction, and divide the sum by the height of one riser. The result will be the least allowable number of risers from the floor above to the riser directly below the header.*

For example, if in Fig. 1 the height of the riser is $7\frac{1}{2}$ inches, according to the rule the nearest that the header could be to the top of the stairs would be over the thirteenth riser, counted from the top, and preferably it would be placed over the fourteenth, as shown in the illustration.

6. In some cases the stairs are placed directly over each other, as at *m l* in the blueprint of the First-Floor Plan. In such cases, approximately one-half of the stairs ascending from the first floor, and a portion of the stairs descending from the first floor, are shown in the same plan. A broken line *n* is shown across these stairs where these indications meet. Whether there is sufficient headroom for stairs so shown can be determined by counting the number of riser lines on the plan. If the treads and risers are of the customary size, there should be at least thirteen risers between the first ascending riser and the first descending riser.

7. In case it is found, when the stairs are tested by the foregoing rules, that sufficient headroom has not been provided, the architect should be notified, so that he may examine the indications of the stairs to see if the design is correct.

8. Number of Treads and Risers.—The number of risers for any flight, as well as the height of the riser, is determined in the following manner: Let it be assumed that the height of the story, from floor to floor, is 10 feet 5 inches and that it is desired to have a riser approximately $7\frac{1}{2}$ inches in height. The height of the story, 10 feet 5 inches, or 125 inches, is then divided by $7\frac{1}{2}$, and the result is found to be $16\frac{2}{3}$. This would mean that sixteen and two-thirds risers of this height would be required. As it is obviously impossible to use two-thirds of a riser, either sixteen or seventeen risers

of equal height must be used. Dividing the story height 125 inches, by 16 gives the result 7.81. In other words, if sixteen risers are used, each riser must be 7.81 inches, or practically, $7\frac{13}{16}$ inches in height. If it is decided, however, to use seventeen risers, 125 inches will be divided by 17, and the result will be 7.35 inches, or practically $7\frac{3}{8}$ inches.

The foregoing process may be stated in the form of a rule as follows:

Rule.—*Assume a convenient height for the riser, and divide the height of the story by this height. This will generally give a number and a fraction. Dividing the height of the story by the nearest whole number will give the exact height of the riser to be used.*

9. Indication of Stairs.—Stairs are indicated on plans by lines showing the location of the treads, as well as the newels and hand rail. As the stairs extend from floor to floor, the entire flight is not shown on any one plan. Instead, only a portion of each flight leading from any floor is shown on the plan of that floor. For example, in the blueprint of the First-Floor Plan, the flight of stairs *k* leading from the hall to the second floor is shown only in part. Beneath the upper portion of the flight, a toilet room is located.

Another case is shown in *l* and *m*, where one flight of stairs ascends directly above another flight. A portion of one flight *l* going down from the pantry is shown, and a portion of the flight *m* running up from the kitchen, is shown. These portions are separated on this plan by the broken line *n*. The remaining portions of these flights are shown on the basement and the second-floor plans. An outside stair to the basement is shown at *o*.

10. It is customary and advisable to show the location of the stairs on the elevations or sections whenever possible. This practice tends to insure proper headroom, as it gives an opportunity to check up the risers, treads, and story heights, as well as the openings that must be left to receive the stairs. The architect usually figures these dimensions out carefully whether he puts all the lines on the drawing or not. When

the section cannot be taken longitudinally through the stairs the outline of the treads and risers is sometimes shown in dotted lines on either the elevations or sections, as in the blueprints of the East Elevation and of the Longitudinal and Transverse Sections.

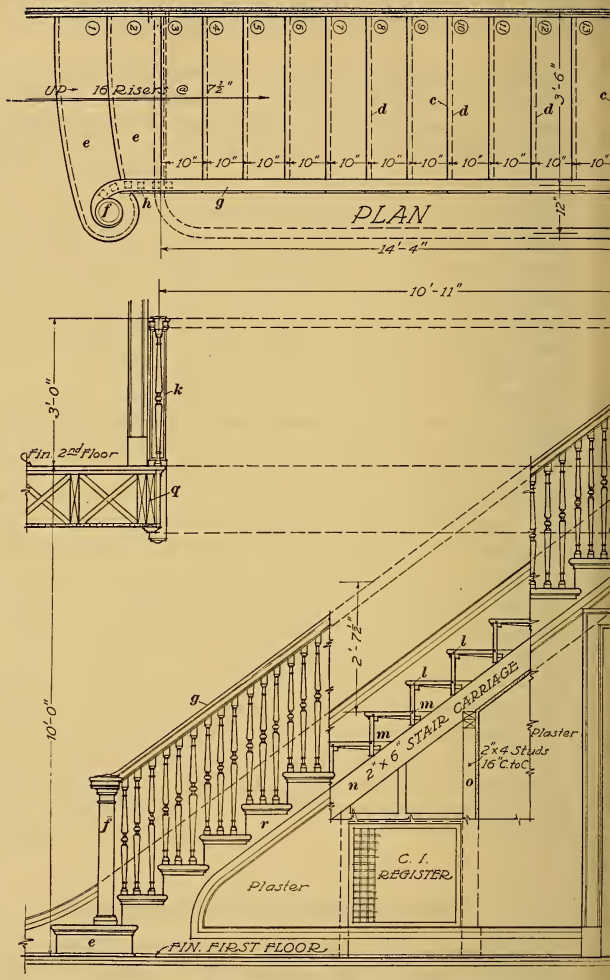
11. The architect designs the general arrangement of the stairs, and usually prepares a scale detail giving measurements which have been carefully worked out. An example of such a detail is given in Fig. 2, which shows the horizontal distance that must be allowed for framing the stairs to be 10 feet 8 inches for the actual open space, to which must be added 2 inches for the thickness of the fascia and the thickness of the top riser. An additional 1 inch is allowed for blocking or adjusting, making a total distance of 10 feet 11 inches. The height of the story from floor to floor is 10 feet, or 120 inches, which, with sixteen risers, makes the height of each riser $7\frac{1}{2}$ inches. The horizontal distance required for the treads is 15×10 inches $= 150$ inches, or 12 feet 6 inches.

For headroom, the header is placed above the nosing of the fourteenth tread, making a total distance down from the second floor of $14 \times 7\frac{1}{2}$ inches $= 105$ inches, or 8 feet 9 inches. From this will be taken the thickness of the floor construction, consisting of 12 inches for the joists, 2 inches for the double floor, and 1 inch for the plaster, making a total of 1 foot 3 inches. This distance, taken from 8 feet 9 inches, leaves 7 feet 6 inches for the headroom. As already explained, the headroom should be at least 7 feet, so this space is ample.

This drawing is a detail of the main stairs of the building shown in the blueprints and should be carefully studied in connection with the prints.

INDICATIONS OF PLUMBING WORK

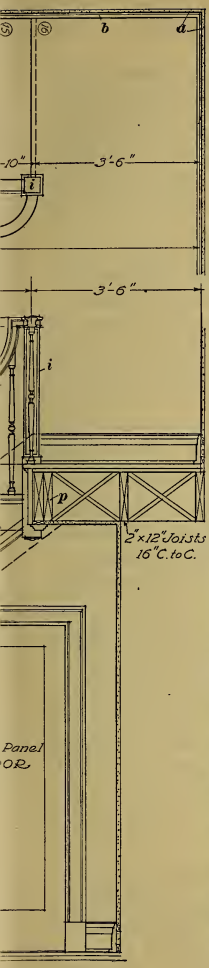
12. Plumbers' Work.—The work of the plumber is shown on drawings by the location of the several fixtures which he is to install, together with the principal soil, waste, and vent pipes. These fixtures consist of bathtubs, shower

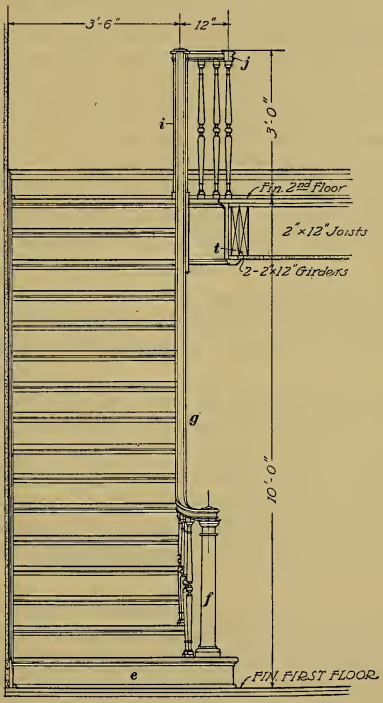


WEST ELEVATION

MAIN STAIR DETAILS

SCALE
0 3 6 9 12





NORTH ELEVATION

baths, wash basins, water closets, kitchen and pantry sinks, laundry trays or tubs, and refrigerator wastes. The fixtures are seldom located exactly on the plan by dimensions, but the architect should allow sufficient room for their installation and proper use. The sizes and designs of the various fixtures are found in the catalogs of the manufacturers.

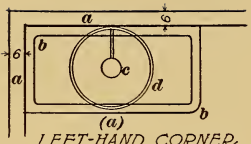
13. Baths, or Bathtubs.—Indications of baths of various kinds are shown in Fig. 3 (*a*), (*b*), (*c*), (*d*), and (*e*).

Built-In Baths.—In (*a*) is shown a bath that is built into a corner tightly against both walls *a*, so that there will be no spaces to catch dirt between the bath and the walls. The rounded corners of the tub are shown at *b*, and the circle *c* represents a shower head, or shower, placed so as to send a spray of water over a bather standing in the tub. The double circle *d* represents a ring placed at the same height as the shower. To this ring is attached a rubber curtain which can be drawn so as to enclose the bather and prevent the water from splashing into the room.

Recessed Baths.—In (*b*) is shown an indication for a bath that is built against the wall on three sides, the front only being exposed. A shower appliance is indicated at the right-hand end of this bath.

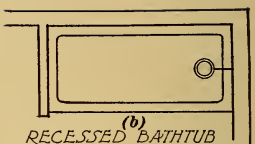
Roll-Rim Baths.—In (*c*) is a free-standing roll-rim bath. Such a fixture stands on the floor on four cast-iron or porcelain feet, and is free from the wall all around. At *a* is the end where the water supply enters and the waste water runs out. The end *b* is semicircular in form and inclined inward to the line *c*. The thickness of the rim is the distance between the lines *d* and *e*. The rounded corners of the tub are shown at *f*.

Shower Baths.—In (*d*) is indicated a shower bath built in the form of a compartment, having sides formed of slabs of marble or glass, and a glass door in the front. The sides and the door prevent the water from splashing out of the compartment. A receptor, or tray, *a* is formed as a floor for this device, and is drained toward the center, where the water enters a trap below the floor.

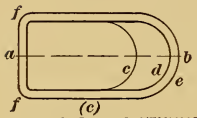


LEFT-HAND CORNER BATHTUB.

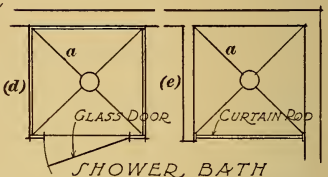
NOTE: RIGHT-HAND CORNER BATHTUB REVERSED



RECESSED BATHTUB WITH SHOWER AT END



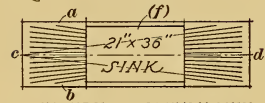
ROLL RIM BATHTUB



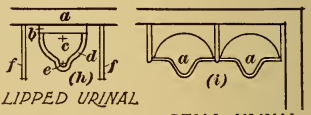
SHOWER BATH

MARBLE-STALL SHOWER BATH WITH GLASS DOOR

BUILT IN SHOWER BATH WITH CURTAIN ROD

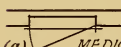


KITCHEN OR PANTRY SINK WITH DRAIN BOARDS



LIPPED URINAL

STALL URINAL



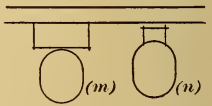
MEDICINE CLOSET

LAVATORIES

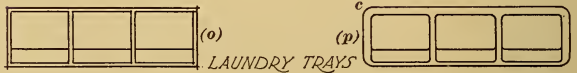
(j) CORNER LAVATORY

(k) STRAIGHT FRONT LAVATORY

(l) OVAL LAVATORY



WATER CLOSETS



LAUNDRY TRAYS

FIG. 3

A shower bath in a compartment or alcove is indicated in (*e*) and, instead of a door, a rubber curtain supported on a rod is provided for the opening.

14. Kitchen and Pantry Sinks.—In Fig. 3 (*f*) is indicated a typical sink such as is commonly used in kitchens and pantries. This sink is marked *21″×36″*, which are the horizontal dimensions. Drain boards are shown at each end of the sink, and grooves, as *a*, *b*, formed in these boards drain water off the boards into the sink. Sinks are indicated in the kitchen and pantry in the blueprint of the First-Floor Plan.

15. Medicine Closet.—The method of indicating a medicine closet that is built into a wall is shown in Fig. 3 (*g*). This indication shows the approximate size of the closet and the direction in which the door swings. The usual location of a medicine closet is in the bathroom above the wash basin. The doors of medicine closets are usually fitted with mirrors instead of wood panels. Medicine closets are seen in two of the bathrooms in the blueprint of the Second-Floor Plan.

16. Urinals.—Two styles of urinals are indicated in Fig. 3 (*h*) and (*i*). In (*h*) is shown a standard form of lipped urinal secured to the wall *a*. The waste or outlet of the urinal is at *b*, and the lip, from which the urinal is named, is at *e*. Slabs of slate or marble *f* are generally placed at the back and at each side of these urinals.

17. Stall Urinals.—In Fig. 3 (*i*) are indicated what are known as stall urinals. These are made of solid porcelain, and are often placed between partitions, as shown. The lip-shaped receptors are shown at *a*, and are in one piece with the urinal. Such urinals are not used in private homes, but are used in offices, manufacturing buildings, and in schools.

18. Wash Basins.—In Fig. 3 (*j*), (*k*), and (*l*) are shown indications of wash basins, or lavatories. The one in (*j*) is a corner basin having an oval-shaped bowl, and has backs, which are shown against the walls by the double line. The

basin in (*k*) is a plain basin placed against a wall. In (*l*) is a free-standing basin supported on a pedestal. Wash basins are indicated in the bathrooms in the blueprints of the Second-Floor Plan, and in the toilet rooms in the Basement and the First-Floor Plans.

19. Water Closets.—In Fig. 3 (*m*) and (*n*) are indications of two styles of water-closet fixtures. The drawing in (*m*) shows a closet with a low-down tank, that is, a tank placed just above the back of the closet. A closet with a high tank is indicated in (*n*). A low-tank closet is shown in the toilet room under the main stairs in the blueprint of the First-Floor Plan. Water closets are located also in the toilet room in the Basement Plan, and in the bathrooms in the Second-Floor Plan.

20. Laundry Trays.—In Fig. 3 (*o*) and (*p*) are indications of laundry trays, or tubs, and two groups of trays are shown. The indication (*o*) is for wooden, slate, or soapstone trays. For porcelain trays (*p*), the edges are made thicker, and the corners are rounded, as at *c*. A set of three trays is shown in the laundry in the blueprint of the Basement Plan.

21. All of the indications of plumbing fixtures just given merely show that a given fixture is required in a given position. There is no attempt made to give details of the fixture. The complete description is always given in the specifications, or else the number and make of the fixture are specified, and the corresponding specification is found in the manufacturer's catalog. Some architects make it a practice to give the plumbing fixtures a number on the drawing for more certain reference in the specifications.

22. Stacks.—The pipes that serve to carry the soil and waste materials from the various fixtures are generally indicated on the plans. These pipes should be so arranged that they will not cut through the framework of the building, and so that they will not be seen. For this reason, partitions to cover the pipes must be built sometimes with $2'' \times 6''$ studs. The vertical pipes in the building are referred to as *stacks*,

and are indicated by small circles in the plans, and generally are marked to show their sizes and purposes. Thus, in connection with the pantry in the blueprint of the First-Floor Plan, a circle representing a 4-inch soil pipe appears in the partition between the pantry and the stairs. In the kitchen the corner of the room is boxed off to take a soil pipe as shown. These stacks serve the kitchen fixtures and the laundry in the basement, as well as the fixtures of a bathroom on the second floor. The Second-Floor Plan shows these same stacks, but in this plan they are marked *Vent*, since no fixtures discharge into them above that floor, and therefore they act merely as vent pipes. Indications of stacks will be seen in connection with all groups of fixtures and all single fixtures.

23. Drains.—As a rule all the vent stacks go through the roof, and all soil and waste stacks go down to the cellar, and thence into a series of almost horizontal pipes called *drains* or *house drains*. These drains are sometimes indicated on the cellar plan of the building, and sometimes, especially where the sewage system of the building is somewhat complicated, on a special plumbing plan. A plumbing section is shown in Fig. 5 of Part 1, *Reading Architects' Blueprints*, and this should be carefully studied.

The drains, besides receiving the contents of the stacks, are often required to take the rain water from the rain conductors, or leaders, and also any water that might collect on the cellar or area floors.

24. Example of a Drainage System.—In Fig. 5 of Part 1, *Reading Architects' Blueprints*, a drainage system is indicated which drains all the stacks from the groups of plumbing fixtures shown. It also drains all leaders, as shown by the leaders numbered *1*, *2*, *3*, and *4*. All of these leaders extend up to the roof, although portions are omitted in this drawing to avoid confusion in the lines of the drawing. The drainage system collects all the soil and water and carries it to the house trap just before it leaves the building. This trap is usually contained in a manhole or brick box having a stone or iron cover. The manhole can thus be opened at any time

and the house trap examined. The house trap is always provided with a fresh-air inlet which admits fresh air to the inside of the trap. The small circles, shown in the areas and in the boiler room in the blueprint of the Basement Plan, indicate drains and traps in one fixture.

25. The rain conductors, or leaders, are taken care of from a point just above the grade line by the plumber, who provides a cast-iron pipe and a trap for each leader stack. An inspection of the blueprint of the South Elevation will show at the foot of each leader the hub of a length of cast-iron pipe.

On the blueprints of the Basement and the First-Floor Plans the rain conductors are marked *R. C.*, and their sizes are given. The rain conductors are sometimes marked *Cond.*, for *conductor*.

INDICATIONS OF SHEET-METAL WORK

26. Rain Conductors, or Leaders.—The portions of the leaders above the cast-iron pipes installed by the plumber are generally of sheet metal. The blueprint of the First-Floor Plan shows them to be rectangular in shape and $3'' \times 4''$ in size for the main roof, and $1\frac{3}{4}'' \times 2\frac{1}{4}''$ for the porches.

The blueprint elevations show the leaders on this building. At the top of the leader is a *leader head*, or *box*, shown at *q* in the South Elevation. When the cornice has considerable projection, as in this case, a *gooseneck p* is provided. This is a piece of pipe that is curved at the ends and connects the gutter with the leader head. The goosenecks can be seen in the East and the West Elevations.

27. Gutters.—The gutters that receive the rain water from the roof are shown in the blueprints of the elevations. The gutter is generally pitched, that is, the bottom of the gutter slopes down toward the goosenecks, although the top of the gutter is kept level for the sake of appearance.

28. Roofs.—Roofs that are to be covered with sheet metal are generally so marked on the drawings. The metal

to be used is sometimes mentioned on the drawings and should always be described in detail in the specifications.

29. Flashings and Counterflashings.—Flashings are used to cover the joints between different parts of the building where water would enter, were the joints not properly covered. The principal places where flashing is used is at the angles between roofs and walls or chimneys, as at *h* in the blueprint of the South Elevation.

30. Between the chimney *e* and the roof is shown a construction called a *cricket*, or *saddle*, the purpose of which is to divert the water from the back of the chimney. This construction is covered with metal which extends under the roofing and is turned up against the chimney, the turned-up edge being covered by counterflashing. In the West Elevation, the same construction is indicated behind the chimney by broken lines.

INDICATIONS OF HEATING EQUIPMENT

31. Types of Heating Apparatus.—The three commonly used types of heating apparatus are *hot air*, *hot water*, and *steam*. Heat is supplied for hot air by a furnace, and for hot water or steam by a boiler. An indication of a boiler is shown on the blueprint of the Basement Plan.

32. Registers.—In buildings that are heated by hot air, the air enters the rooms through registers generally made of cast iron. These registers are sometimes placed in the walls or partitions, and sometimes in the floor or ceiling. A wall register is indicated as in Fig. 4 (*a*), a ceiling register as in (*b*), and a floor register as in (*c*). In the blueprint of the First-Floor Plan, floor registers are shown at *p* in the dining room and at *q* in the living room. A register face is seen in the partition under the stairs in Fig. 2.

At *a* in Fig. 4 (*d*) is shown a section through a hot-air duct, such as is placed in a wall or partition, for carrying hot air from a furnace to a register located in one of the rooms of

the building. When provided with a wall outlet, the register appears as a heavy solid line, as at *b*. An arrow shown at *c* with a straight shaft indicates the direction in which the air flows.

When a ventilating system is provided, and air is to be removed from a room, the register face in a wall appears as in Fig. 4 (*e*), the outlined register indicating that the air passes out from the room into a conveying duct. A ceiling register or outlet is indicated as in (*f*), and a floor outlet as in (*g*). When an outlet duct in a wall is shown in plan, it appears as at *a* in (*h*), a register face being shown as a rectangle enclosed with light lines *b*, the arrow *c* with a wavy shaft indicating the flow of air from the room into the duct.

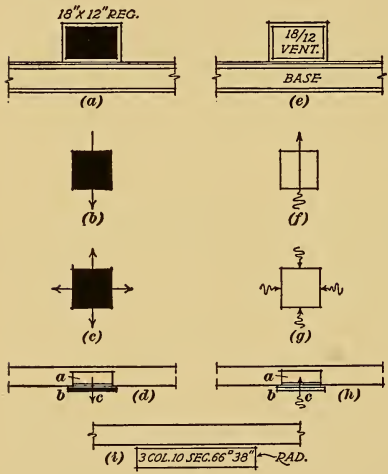


Fig. 4

The register faces through which the air passes are usually marked with the size of the face as in (*a*) and (*e*), the abbreviation *Reg.* for register being applied sometimes when a hot-air or fresh-air register is indicated, and *Vent.* being used for a ventilating flue or outlet.

Register faces placed in front of concealed radiators are shown the same as hot-air registers. Examples of these registers are seen in the blueprint of the First-Floor Plan at *r*, where there is a radiator concealed under the main stairs in the hall, and another radiator concealed under the seat in the living room, at *s*.

33. Radiators.—A hot-water or steam radiator is indicated on plans by a plain rectangle with the abbreviation *Rad.* as in Fig. 4 (*i*). The type and capacity of the radiator are indicated by the figures and marks in or near the rectangle By *3-col.* is meant a three-column radiator, there being three vertical passages through which the water or steam passes By *10-sec.* is meant that there are 10 sections to the radiator The *38″* shows the height of the radiator above the floor, and the *66*□ gives the number of square feet of radiating surface in the radiator. These marks are generally given to the architect by the heating contractor. They are often omitted from the architect's drawings and shown on a separate set of drawings that are prepared by the heating contractor.

34. Radiators are sometimes concealed and the heat from them enters the room through a register or grille. In the blueprint of the First-Floor Plan, at *s* in the living room, a radiator is concealed beneath the seat, which is marked *Seat, rad. under*. In such a case the register is fitted into the front of the seat. A radiator is also concealed under the stairs in the hall, as shown at *r*, from which the heated air enters the hall through a hinged register, as shown at *s* in the scale detail, Fig. 2.

35. Radiators are sometimes arranged so that fresh air is taken from the outside of the building and heated by the radiators before it enters the room. Such radiators are known as *indirect* radiators, and are generally concealed below the floor of the room to be heated. The air passes to the room through a duct and a floor or wall register. Thus, indirect radiators are placed under the living room and under the dining room shown in the blueprint of the First-Floor Plan, and the heated air enters through the floor registers *p* and *q*.

36. The piping used for hot-water and steam heating is seldom shown on the plans, as the exact location depends somewhat on the location of the studs, joists, and other framing. The sizes of the piping are seldom indicated on the

architect's plans, but this information appears in the specifications, or in the plans prepared by the heating contractors.

37. Kitchen Range.—In Fig. 5 is indicated an arrangement of a kitchen range and the smoke flue in connection with it. The rectangle, $2'\ 6'' \times 4'\ 6''$, represents the range itself, the larger rectangle representing the cement or brick hearth. Back of the range is a brick wall $8\frac{1}{4}$ inches thick, and at the right side of the range is a chimney flue *a*. This flue is shown surrounded by double lines which indicate terra-cotta flue lining. The space *b* between the flue lining and the brick flue is carried up to the top of the chimney and serves as a ventilating duct to take away odors from the kitchen. At *c* is a register set in the face of the flue through which hot air and odors pass into the ventilating flue *b*. Below this ventilating register is an opening through which passes the sheet-iron flue from the range to the smoke flue *a*, thus forming the draft connection for the fire in the range.

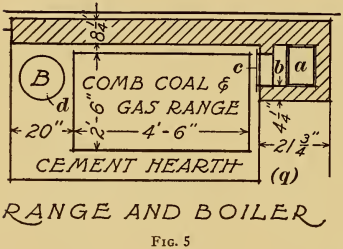


Fig. 5

38. At *d* is a circle representing a range boiler for hot water. The boiler is connected with the range and is shown standing on the hearth. A gas heater with a separate gas connection is sometimes connected to the boiler for the purpose of heating water independently of the range.

39. In the blueprint of the First-Floor Plan, at *t* in the kitchen a boiler is indicated in the manner shown in Fig. 5, and its capacity is 60 gallons.

Sometimes a boiler is supported from the ceiling in a horizontal position. In this manner floor space is saved, but in general the arrangement is not so satisfactory as when the boiler is vertical.

INDICATIONS OF GAS AND ELECTRICITY

40. Gas Heating and Lighting.—Gas is used for both fuel and for illuminating purposes. As a fuel it is usually connected to a combination range or to a gas range, and an outlet must be provided near the range, as in Fig. 6 (*a*). This outlet is marked *F.* or *F. G.*, to indicate that fuel gas is to be brought to that point. On a plan, fuel-gas outlets are indicated as in (*b*) when a wall outlet is to be provided, as in (*c*) when a ceiling outlet is to be provided, and as in (*d*) when a floor outlet is to be provided.

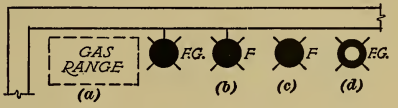


FIG. 6

41. Symbols for illuminating gas are similar to those for fuel gas, except that the letters *F.* or *F. G.* are omitted. A number is affixed to the symbol, indicating the number of gas tips on the fixture. Thus, in Fig. 7 (*a*) a two-tip wall outlet is represented, in (*b*) a three-tip ceiling outlet, and in (*c*) a four-tip floor outlet. These symbols on the plans indicate to the gas-fitter that he must install piping to supply the correct number of tips, but do not necessarily indicate that the fixtures are to be included in his contract.

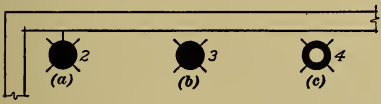


FIG. 7

42. Electricity.—In electric wiring, the indications show the location of the outlets to which the wiring must be brought, and the number of lights for which provision must be made. Thus, in Fig. 8 (*a*) a two-light wall outlet is indicated; in (*b*) a three-light ceiling outlet,

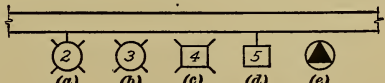


FIG. 8

or drop light, is indicated; in (*c*) a four-light floor outlet; in (*d*) a five-light baseboard outlet, and in (*e*) a special outlet for such purpose as may be designated. The wiring itself is not indicated on the architects' plans.

43. Combination Outlets.—In many cases a fixture is arranged for both gas and electricity. Thus, in Fig. 9 (*a*) is shown a wall outlet for three electric lights and two gas tips, while in (*b*) is shown a ceiling outlet for four electric lights and three gas tips.

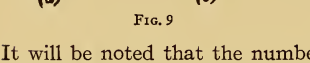


FIG. 9

It will be noted that the number of electric lights is always placed above the number of gas tips. The letter *E* for electric lights and *G* for gas tips are sometimes omitted, but such an omission is apt to cause confusion.

44. Other Electrical Indications.—Switches to control the electric lighting are frequently shown on the architect's plans. One method of indicating switches is shown at *a* in Fig. 10, an *S* being shown for each switch. When the number of switches is large, a Roman numeral is sometimes used to indicate the number. Some architects draw lines from the switches to the lights which they control, as at *b*. A *panel board*, or *distributing panel*, from which the electric current is distributed to various points, is indicated at *c*.

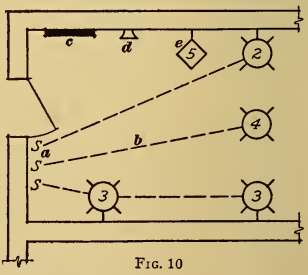


FIG. 10

An outlet for a telephone is indicated at *d*. This indication means usually that the contractor is to provide a conduit from the place where the telephone line enters the building to an outlet box at the point indicated. This permits the telephone company to install the instrument without boring holes or running exposed wires. Annunciators are indicated

as at *e*, the numeral indicating the number of points to which the annunciator is connected.

These indications are the ones commonly used by architects. Electrical contractors sometimes prepare more elaborate working plans, showing in greater detail the arrangement of their circuits and other equipment. These plans are submitted to the architect for approval.

PLANS OF A FRAME DWELLING

45. General Description.—In the foregoing Section and in the preceding pages of this Section, have been explained in detail the methods by which architects indicate on drawings the various forms of construction and the different materials used in buildings. In connection with these explanations, frequent reference has been made to the set of blueprints of a dwelling which accompany *Reading Architects' Blueprints*, Part 1. These blueprints will now be analyzed in order to make plain how the intentions of the architect have been indicated.

46. It is the aim of the architect to make his drawings so that they will convey definite ideas and be readily understood by men who are familiar with building materials and the methods of using them. Therefore, it is important that there shall be a definite reason for every symbol, line, letter, or figure placed on a drawing. No line or mark that does not have a special significance should appear on the drawings, as such lines or marks would confuse the contractor.

Repetition of indications or measurements on features that are identical in size and form need not, however, be made. For example, when belt courses, cornices, columns, etc., are ornamented by carvings, the ornamentation is often indicated over only part of the surface, and the fact that the entire surface is to be carved is indicated by the words *repeat ornament* or *continue carving*. In no case, however, should any room be left for doubt regarding the amount of work called for.

47. Architects differ in their methods of making drawings, and the reader in the course of his experience will see drawings that differ in some respects from those shown in the accompanying set of blueprints. These blueprints show, nevertheless, a complete representation of the building at a scale of one-quarter of an inch to the foot, and are standard, first-class drawings.

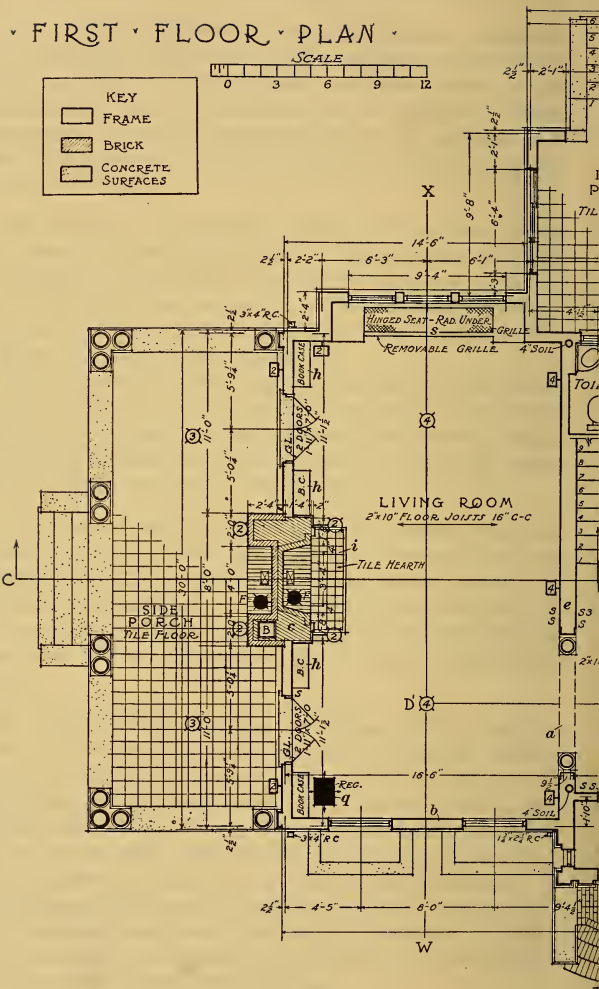
48. This set of blueprints consists of four floor plans, four elevations, and two sections. Each of these drawings is important and necessary, and shows features of design and construction that are not shown on the other drawings of the set. Taken together, they form what is called a "set of plans" or "the working drawings."

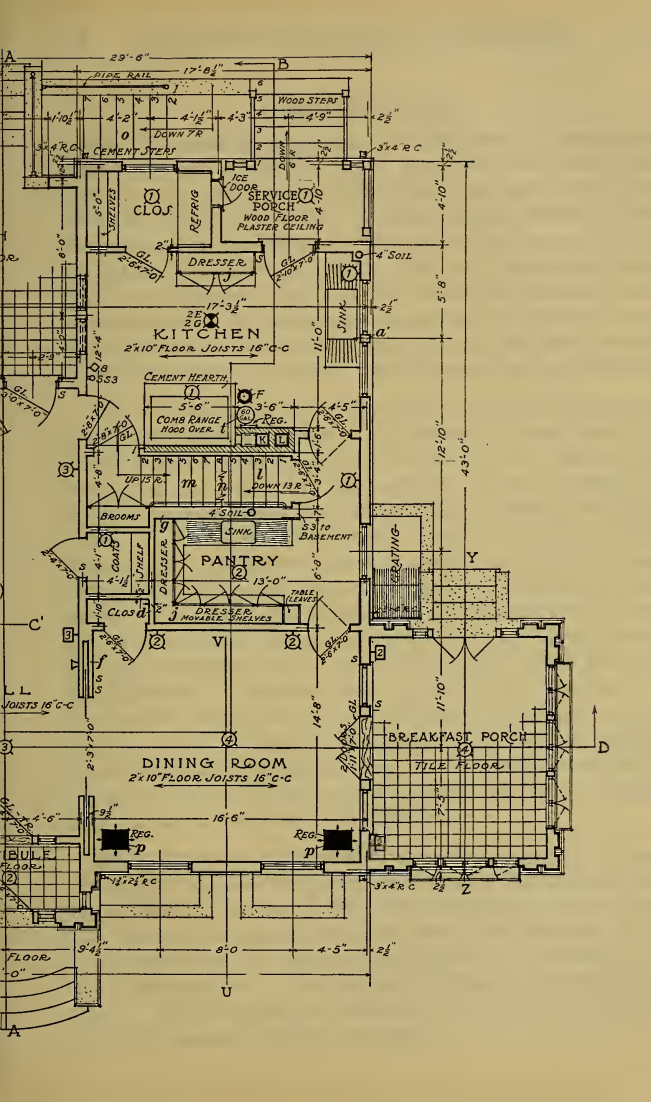
For the benefit of readers who may not have the blueprints at hand, a set of plates is inserted in this book. These plates are duplicates of the blueprints, except in the matter of scale, the blueprints being at a scale of $\frac{1}{4}' = 1'\ 0'$, while the plates are at the scale indicated on the drawings.

49. A set of blueprints, such as these, together with a set of specifications, is what the contractor receives from an architect when the contractor is asked to give an estimate of the cost of the building. It is therefore important that the contractor should thoroughly understand the drawings in order that he may figure the costs of the building intelligently.

50. Description of the Building.—The building shown on the blueprints is an eight-room residence, consisting of two stories, a basement, and an attic, or third floor. In addition to the living room, dining room, kitchen, and five bedrooms which make up the eight principal rooms, there are the various halls, stairs, closets, bathrooms, porches, etc., that are generally required in a house of this character.

The house is built upon a concrete foundation and the cellar or basement walls are of concrete. The upper walls are of wooden frame construction covered with lath and stucco, and the roof is covered with shingles.


FIRST FLOOR PLAN
SCALE
0 3 6 9 12
KEY
FRAME
BRICK
CONCRETE SURFACES
LIVING ROOM
2"x10" FLOOR JOISTS 16" C-C
TILE HEARTH
SIDE PORCH
TILE FLOOR
HINGED SEAT - RAD UNDER
REMOVABLE GRILLE
GRILLE
REG.
X
W
C
D


PIPE RAIL
WOOD STERS
CEMENT STEPS
DOWN 7R
CLOS.
SHELVES
REFRIG
ICE DOOR
SERVICE PORCH
WOOD FLOOR
PLASTER CEILING
DRESSER
4" SOIL
SINK
KITCHEN
2"x10" FLOOR JOISTS 16" C-C
CEMENT HEARTH
COMB RANGE
HOOD OVER
REG.
UP 13 R.
DOWN 13 R.
BROOMS
SHELF
COATS
DRESSER
PANTRY
53 TO BASEMENT
GRATING
TABLE (LEAVES)
DRESSER
MOVABLE SHELVES
DINING ROOM
2"x10" FLOOR JOISTS 16" C-C
BREAKFAST PORCH
TILE FLOOR
FLOOR

FIRST-FLOOR PLAN

51. General Description.—A floor plan is a horizontal section through a building, and it shows the arrangement of parts on any one floor. A plan should be drawn for each floor of a building, as a rule. For the building shown in the blueprints, there are four plans, one each of the basement, first, second, and third, or attic, floors. The roof plan is combined with the third-floor plan, and the foundation plan with the basement plan. Of these plans the most important is the First-Floor Plan, as it shows the principal rooms of the house, those in which the family live and in which guests are entertained.

52. The rooms found on this plan are the living room, the dining room, and the kitchen. In addition to these, there is a hall, which communicates with the living room, the dining room, the rear porch, and the vestibule, as well as with the kitchen, the coat closet, and the toilet room beneath the main stairs. A large side porch extends along the left side of the living room. An enclosed porch is shown on the right of the dining room, and is designed to be used as a breakfast porch or room. Between the kitchen and the dining room is the pantry, from which the meals are served to the dining room and the breakfast porch. From this pantry, stairs lead to the basement. A service porch is provided at the rear of the building to give access to the kitchen. A large closet at the rear of the kitchen contains the refrigerator, into which ice is placed through the ice door in the service-porch wall. From the kitchen a flight of stairs, called the service stairs, or back stairs, leads to the second floor.

53. Entrance.—The first feature that is met by a person entering this building is the front steps. These are shown in the plan by four curved lines, three of which are stopped at the ends by rectangles projecting from the building. The steps themselves are made of brickwork, as is indicated by the numerous lines. The platform or floor is marked *Brick Floor*. The rectangles on each side of the floor are dotted indicating stone, concrete, or stucco.

54. In order to comprehend fully the meaning of this plan of the entrance steps, it is necessary to consult other drawings in this set. On the South Elevation is seen an elevation of these steps. The steps themselves are indicated as brick, and the rectangles on the plan are here shown to represent blocks of concrete on each side of the steps. These blocks are known as *cheeks*. The height of the risers and the height of the cheeks can be measured from this elevation.

The idea of these steps as given in the plan is very different from the idea shown in the elevation. Each idea is in itself incomplete, but the plan and the elevation taken together give a very satisfactory conception of the design of the steps.

The East Elevation shows a side view, or elevation, of the steps. The cheek is seen, and it hides most of the steps from sight. By the use of broken lines, however, they are indicated. The West Elevation gives a similar view of the other side of these steps.

The Basement Plan gives further information regarding the foundations of these steps. This foundation is designed to support the steps, platform, and the cheeks. The indications are those for concrete.

55. On the First-Floor Plan will be seen a section line *A–B* cutting through the plan. There must therefore be a section on the line *A–B*. This is found to be the Transverse Section. At the left-hand side of this section will be found a section through the steps. This section gives valuable information regarding the construction of these steps which appears on neither the elevation nor the plan. It shows a cut through the steps and platform, which are indicated as brickwork. It also shows that the steps are supported upon an inclined reinforced-concrete slab, the lower end of which rests upon a concrete wall, and the upper end on the wall *b*. The double line under the brick platform and steps indicates a space for the mortar bed in which the bricks are laid. The supporting wall *a* extends far enough into the ground below

the grade line so that it will not be moved by the action of frost. Around these walls are indications showing earth.

56. It will be seen that more than one drawing is required to indicate properly all the points that it is necessary to know before a feature such as the front steps can be constructed. In examining other features all the drawings that show parts of these features should be studied so as to obtain all possible knowledge regarding them.

57. The Vestibule.—The First-Floor Plan shows the vestibule projecting in front of the building. In the front wall of the vestibule is the main entrance door, which is a single door and marked $3'\ 4''\times 7'\ 0''$, which is the size of the door. The South Elevation shows this door in elevation. On each side of this door is a small window, which is called a *side light*. A corresponding window over the top of the door is known as a *transom*, or, if the window is stationary, as a *head light*. On each side of the front wall of the vestibule the plan shows two projecting rectangles with faint lines around them. On the South Elevation these rectangles prove to be pilasters, and the faint lines are the bases of the pilasters.

The East and the West Elevations show the side elevations of the projecting parts of the vestibule. The pilasters and side windows are shown corresponding to those on the plan.

In this plan, a stone sill is shown under the door opening. A tile floor extending over the entire vestibule is indicated by the squares and the notation *Tile Floor*. The indications, or squares, are shown over only a part of this floor, as is customary, but it is obviously unnecessary to show any more than is indicated in the plan.

The Transverse Section gives valuable information regarding the construction and the support of this part of the building. It shows that the front wall of the vestibule is supported on the wall *b*, and a corresponding wall is shown under the inner wall of the vestibule. These walls are indicated on the Basement Plan, the wall *b* in the section being marked *i* in the Basement Plan. This section further shows a concrete

slab resting on these two walls and supporting the tile floor. It also shows a paneled treatment of the walls, indicated at *j*, and a cornice at the top of the wall. A double beam is indicated which supports the portion of the front wall that extends across the ceiling of the vestibule. The construction of the roof and cornice of the vestibule is also indicated.

In the plan, a marble saddle is shown under the inner door of the vestibule. This door is called a vestibule door, and beside the dimensions on it appear the letters *Gl.*, indicating that a glass panel is to be placed in the door. The letters *Tr.* indicate that there is a transom over the door.

58. The foregoing articles illustrate the method of analyzing a portion of a plan. Such analysis includes the finding of parts of the other drawings that may present the part under consideration from other points of view, and thus obtaining all possible information. A careful study and comparison of the accompanying blueprint drawings in the manner just shown will result in the ability to handle a set of plans so as to get all there is out of them.

59. The entrance steps and the vestibule would not be erected from the blueprints of this set, but large-scale studies and drawings would be made, as well as full-size details of the caps, bases, moldings, etc., from which these features would be constructed. There is, nevertheless, sufficient information given in the prints to enable an experienced contractor to give an accurate estimate of the cost.

60. The Hall.—Between the hall and the dining room is a pair of sliding doors, indicated in the manner described in *Reading Architects' Blueprints*, Part 1. The indication of the sliding doors on the First-Floor Plan shows that the size of each door is 2′ 3″×7′ 0″. The section line *A–B* passes through this sliding door and turns at the middle of the dining room so as to be parallel with these doors. Consequently, on the Transverse Section on the line *A–B*, the opening for the sliding door will be seen in part, as at *k*. The actual doors are, however, not shown.

61. The finish of the dining room is also indicated at *l* in the Transverse Section. The doorway has a pilaster on each side of it and a cornice over it, forming a trim. This cornice extends all around the room. The walls are paneled and wainscoted. It is not stated on the drawing what material is used in this decoration, since decoration as elaborate as that shown is often done under a different contract from that for the main part of the building. If the decoration is to be included in the contract for erecting the building, the treatment of the dining room should be carefully described in the specifications. Detail drawings should also be made at a large scale, so as to show the intentions of the architect more clearly.

62. In the hall, opposite the sliding doors, as shown in the First-Floor Plan, is the entrance to the living room. This is not a doorway, but is an opening as indicated. A column is seen at each side in this opening. The heavy circle indicates the column, the larger circle shows the base molding, and the square represents the square part of the base. Back of each column is a pilaster, with a similar base. These also appear in elevation in the Transverse Section, and an ornamented cornice is shown above these columns and pilasters. This cornice extends around the hall, except over the stairs, and makes a rich and impressive effect. This feature must be carefully shown in detail drawings, from which it will be constructed.

63. Main Stairs.—The main stairs are shown at *k* in the First-Floor Plan. The subject of reading plans with reference to the stairs has been carefully discussed, and the indications shown on this plan should be familiar.

A toilet room is shown under the stairs, and this suggests the question of headroom beneath the stairs. By counting the number of risers it will be seen that the wall of this toilet room is under the tenth riser. These risers being $7\frac{1}{2}$ inches in height, the distance from the floor to the top of the tenth riser will be 75 inches, or 6 feet 3 inches. If from this a height of 18 inches is deducted for the construction of the stairs, it

will be found that the headroom at this wall is 57 inches, or 4 feet 9 inches, which is sufficient at this point in this toilet room.

The height of the door opening that can be obtained for this room can be calculated. Though all the risers are not shown on the plan, measurement will show that the edge of the door opening opposite the hinge is under the twelfth riser. Twelve risers at $7\frac{1}{2}$ inches each give a height of 7 feet 6 inches from the floor to the top of the riser. Allowance of 18 inches for the construction of the stairs leaves 6 feet clear headroom, which is sufficient. An elevation of the main stairs appears at *i* in the Longitudinal Section.

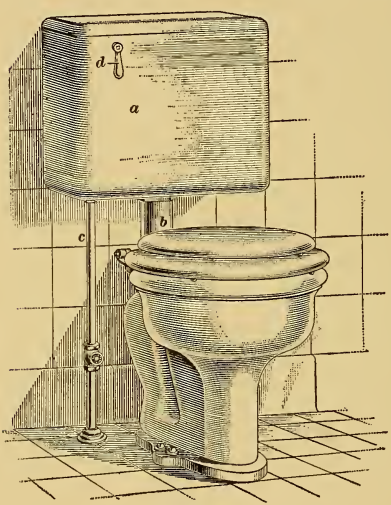


FIG. 11

64. In the toilet room beneath the main stairs, a corner wash basin is indicated. The window, which is also indicated should have a high sill so that it will be above the top of the wash basin. The water closet, on account of the limited headroom, is of the low-down tank type, as is indicated. This type of fixture is shown in Fig. 11, in which the tank is shown at *a*, the pipe for flushing at *b*, the water-supply pipe at *c*, and the lever for starting the flushing at *d*.

65. Closets.—Opening into the hall, as shown on this plan, is a closet for hats, coats, umbrellas, and other things. A shelf is shown by a line and also is marked. The letter *S*

on the jamb of the door indicates a switch that is operated by the closing or opening of the door. When the door is opened, the light is turned on in the closet. The walls of the closet are made thin by placing the studding flatwise in the partitions. This can be done where the partitions are not very long and are well braced, as they are around this closet. Flatwise studs occur in other parts of the building also.

An indication for a telephone is shown to the right of the coat-closet door. This position will permit placing a suitable table or stand to receive the apparatus.

A small closet, marked *Brooms*, is "worked in" back of the coat closet, making a very convenient place for receiving brooms, pails, carpet sweepers, and many of the utensils needed in house cleaning.

A closet is provided in the dining room for purposes connected with that room.

66. Rear Porch.—Back of the hall is shown a rear porch, which has a tile floor, as noted by the words *Tile Floor* and the squares which extend over a part of this floor. As has been pointed out, it is unnecessary to indicate tile over the entire surface. A flight of concrete, or cement, steps leads down from this porch to the garden level. The windows shown on the west side of this porch are sliding windows. On the east wall of this porch is a high window, shown by dotted lines.

67. Living Room.—The indications given in the living room will next be examined. The entrance opening from the hall has been discussed. The south wall is indicated as a frame wall, in which two double-hung windows are shown. The openings to the side porch are shown as French windows, which are indicated in the manner described in the previous Section. The French windows are shown on the West Elevation. Stone sills are shown both in the plan and the elevation. These windows will be built from scale and full-size details that will be furnished as the work of building progresses. The windows in the bay on the north side of the room are plain double-hung windows. These may also be

seen in the North Elevation. Book cases are indicated at *h* in the plan. They are indicated merely in outline and would be built from scale and full-size details. If they are to be included in the same contract as the rest of the house, the scale details should be made and given to the contractor with the rest of the blueprints, to be estimated on.

68. Fireplaces.—There are two fireplaces shown, one in the living room and one in the side porch. The body of the chimney is shown hatched in one direction and the brick facings of the fireplaces and chimney breast are shown hatched in the other direction. This latter hatching shows that the face of the chimney on the porch is treated with a special brick. The hearths within the fireplaces are shown with brick laid on edge with a simple pattern. This may be made of firebrick. The hearth in front of the living-room fireplace is of fancy tile, shown in squares and marked *Tile hearth*. At the backs of these fireplaces are shown small rectangles with diagonal lines. These indicate small cast-iron doors opening into ash chutes. The section line *C–D* shows that a section through these fireplaces has been made, and this will be found in the Longitudinal Section. The ash chutes are plainly shown on this section and lead down to a chamber, or ash-pit, formed in the base of the chimney. The Basement Plan shows this ash-pit with a clean-out door in front of it, through which the ashes are removed.

The double line around the outside of the tile hearth represents a strip of hard wood that is fitted tightly against the hearth, and nailed to the floor. The circles filled in solid indicate outlets for fuel gas. In the south end of this chimney is seen a flue with double lines around it. These lines indicate that the flue has a terra-cotta lining. The Basement Plan shows that this flue is for the steam boiler for heating the building, and that the boiler and the flue are connected by a galvanized-iron smoke pipe.

In the Second-Floor Plan the three flues are seen side by side in the chimney and built symmetrically with reference to the axis of the living room. All these flues are shown lined.

69. Various Features.—In the First-Floor Plan, a seat is shown built into the bay window at the north side of the living room. This seat is designed to cover a radiator, and is hinged so that it can be raised. Grilles are indicated in the front of the seat and are shown at *m* in the Longitudinal Section. By raising the seat the radiator can be reached and controlled.

70. In the front of the living room the First-Floor Plan shows a floor register at *q*.

There are two electric-light outlets in the ceiling, with the capacity of four lights each. Two side lights are indicated on the fireplace. The exact location of these lights will be determined by the design of the mantel. Four base outlets are provided so that floor lamps can be used at various parts of the room if desired.

The framing of the floor joists is indicated at various places by a line with arrows at the ends and the notation *2″×10″ Floor Joists 16″ c-c.*

71. Dining Room.—The dining room as it appears on the plan is a room almost square with all of its sides designed to be symmetrical. Thus the sliding door opening to the hall is centered on the left side of the room. The doors to the closet and to the pantry are placed at equal distances each side of the center of the room. The same is true of the doors and windows to the breakfast porch and the windows in the front wall.

The indications of floor registers at *p* and the light outlets are familiar and explain themselves.

The section lines *A–B* and *C–D* through the room call attention to the fact that parts of the room are shown on two sections. In the Transverse Section is seen the door trim of the sliding doors, and the wall paneling. In the Longitudinal Section is seen one complete side of the room, showing the doors to the closet and to the pantry, and the paneling of the wall in between, as well as an ornamented plaster or wood cornice around the room. A picture mold. or molding, is also indicated. The details of these features

of interior treatment will be constructed from drawings made at a larger scale and from full-size drawings.

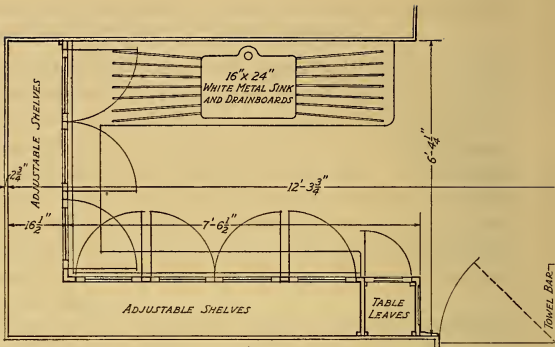
72. Breakfast Porch.—The First-Floor Plan alone will tell the experienced architect a great deal about the breakfast porch, but an inspection of the South, East, and North Elevations will give an excellent idea of its external design, and will make clear the indications in the plan. The section of the porch shown on the Longitudinal Section will give further information. All these drawings having been examined, it will be seen that the outside of the walls are decorated with pilasters, and that sections through these pilasters are shown in the plan.

The windows are casement windows opening outwards, some being double casements and others single.

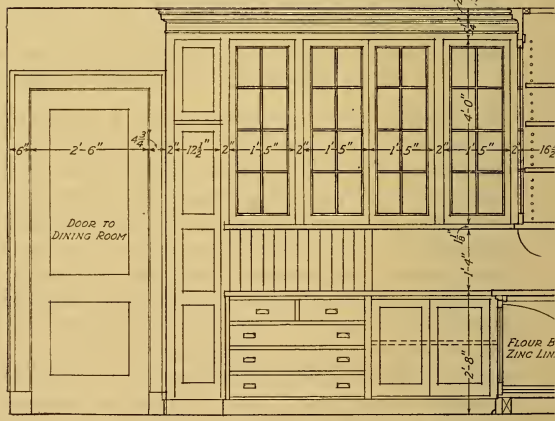
Double doors are indicated leading to the outside steps, which are dotted for concrete. These doors show on the North Elevation, and the steps are seen below them.

The tile floor and the baseboard outlets on the floor of the breakfast porch are indicated in the usual manner. Flower boxes are shown under two of the window groups.

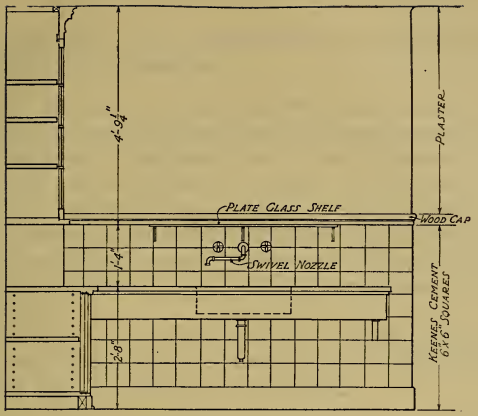
73. Pantry.—A double-swinging door connects the dining room and the pantry. The essentials of the pantry are dressers, counter shelf, and sink. The sink is indicated on the north wall of the pantry. The dressers on the west and south walls consist of shelves enclosed by glazed doors for the upper part, a counter shelf extending under this, and enclosed drawers or cupboards beneath the counter shelf. The section line *A–B* extends through the pantry; therefore, on the Transverse Section an elevation of part of this dresser is shown as well as a cross-section. A cross-section of the sink is also shown. By carefully studying the plan and the section together, an excellent idea of the general design of this dresser may be obtained. In Fig. 12 is shown a large-scale detail of this pantry, in which the various parts have been drawn in larger size, and from which the contractor builds these dressers. This detail will be discussed more particularly later on, but it will be very instructive to compare it



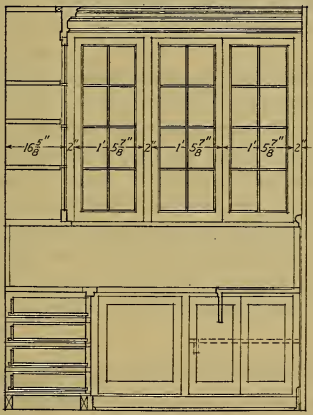
PLAN



LEFT SIDE ELEVATION



RIGHT SIDE ELEVATION



END ELEVATION

PANTRY - DRESSER - DETAILS

94210

diligently with the plan and section at the quarter-inch scale, as shown on the blueprint.

74. Kitchen.—In the First-Floor Plan another double-swinging door is shown leading from the pantry to the kitchen. A kitchen sink is indicated, close to which is shown a 4-inch soil pipe into which the sink wastes. An electric outlet is shown, by which the sink is lighted. Double-hung windows with a mullion *a'* provide an abundance of light for the kitchen and especially for the sink. A dresser is indicated, which will be like the dresser in the pantry in arrangement and construction.

A cement hearth is indicated, also a combination gas and coal range with a hood or canopy over it. The range may or may not be included in the contract.

75. A circle *t* containing the expression *60 gal.* indicates a hot-water boiler of 60 gallons capacity. A circle with radiating lines, marked *F*, indicates an outlet for fuel gas for the range.

A chimney is shown built of brick, and a brick wall extends behind the range as a means of fire protection. The chimney contains two lined flues and one unlined flue. The broken line that extends through the unlined flue represents the smoke pipe from the range to the lined flue marked *K*. The opening into the unlined flue from the range side is an opening that is above the stove pipe and under the hood. This opening exhausts the smoke and odors from cooking from under the hood, and is covered by a grille. A line marked *Reg.* indicates a similar vent opening from the kitchen into the same flue.

76. In the west wall of the kitchen, two high windows are indicated by the dotted lines. These will be seen in elevation at *i* in the Transverse Section. An annunciator with eight points is shown, also a door bell and a three-way switch. This switch turns on and off the electric light at the top of the service stairs from the kitchen, and a corresponding switch at the head of the stairs may be used for

operating the light from that position. Similar switches are indicated at each end of each flight of stairs.

77. Kitchen Closet.—In the closet off the kitchen, the shelves on the left side are indicated by lines and the word *shelves*. The number of shelves should be specified. The refrigerator is indicated on the right side of this closet, and it will be purchased from the manufacturer and set in place. The refrigerator will have to be selected before the exact location of the ice door can be determined and the ice door will be fitted in the wall to supply the refrigerator. Additional shelves or even a simple cupboard can be installed above the refrigerator if desired.

By means of a glass panel placed in the door to the kitchen, a certain amount of borrowed light will enter the kitchen at this point. This will add to the cheerfulness of the room.

78. Service Porch.—The service porch is placed so as to shelter the kitchen door. Five square posts are shown and railings between them. The design of the posts and railings can be seen on the North and the East Elevations, and a section through the porch appears on the Transverse Section. In this section, at *o*, the floor of this porch is shown lower than the floor of the kitchen. This floor is directly over a part of the laundry ceiling and is waterproofed so as to prevent water leaking through and spoiling the ceiling. This can be done by placing one or two layers of waterproof paper beneath the flooring, and sloping the floor away from the kitchen, so as to shed water rapidly.

The ceiling of the porch is under part of the floor of the room in the second story. This will cause this floor to be cold in cold weather unless it is insulated by some substance such as mineral wool, as shown in this section. In order to hold this mineral wool in place, a rough board floor is cut in between the joists and rests on cleats which are nailed to the sides of the joists.

The ice door *p* is shown in this section, but, as has been pointed out, will not be finally located until the dimensions of the refrigerator have been obtained.

79. A flight of steps leads from the service-porch floor to the ground level. A hand rail is shown on each side of the steps and is secured to the posts of the porch. These steps are shown on three of the elevations and in the Transverse Section. All of these drawings should be studied in conjunction with the plan to gain all the information possible.

80. Service Stairs.—The service stairs extend from the basement floor to the attic floor, or through three stories. The flight from the basement to the first floor ends at the pantry, as shown at *l* in the First-Floor Plan. The door at the top of this flight is a 2′ 6″×7′ 0″ door and is provided with a glass panel which will furnish light to the stairs. Another flight starts from the kitchen and is entered through a door having a glass panel. This flight, however, is well lighted from the window in the second-story hall. The electric outlets are placed at the tops of the flights in all stories so as to furnish light on the stairs at night time. A handrail is shown at the side of each flight.

81. The flights leading from the first floor to the basement and to the second floor are shown in elevation at *j* and *k* by broken lines in the Longitudinal Section. By drawing the stairs in elevation, the headroom between them can be seen and measured and errors avoided. Measured from the top of any riser in the lower flight to the top of the riser above it in the upper flight, the distance will be found to be 8 feet 6 inches. If an allowance of 18 inches is made for the construction of the upper flight, the remainder will be 7 feet, which is sufficient headroom.

At *l* in the Longitudinal Section is shown the elevation of the flight from the second floor to the third floor. On the East Elevation will be seen elevations of the service stairs extending from *a* to *f*.

82. The Side Porch.—The features on the side porch that are characteristic are the columns. The location of these columns is shown in general on the plans, but will be better understood by referring to the South, West, and North Ele-

vations, and to the Longitudinal Section. The West Elevation shows the effect that is desired in this porch. The cornice and the balustrade are of exactly the same design as those of the breakfast porch. It will be noted that the square parts of the column bases are made of cement or concrete.

A fireplace has been provided to be used when the porch is enclosed. It is intended that a set of removable glazed panels be placed between the columns in cold weather, and removed in summer. This porch will thus serve as a sun room in winter and as an open porch in summer.

The Longitudinal Section shows a cut through this porch, and the construction of the floor and steps can be seen. This concrete construction will be reinforced by some standard mesh, and all tied together with rods, especially at the junction of the floors and walls. The construction of the roof, cornice, etc., is also roughly indicated, and the actual construction will be in accordance with scale and full-size details.

83. Areas.—While areas are shown in connection with the basement windows, and consequently on the Basement Plan, they also appear in the First-Floor Plan, where the tops of the area walls are shown. Four of the areas appear in front of the south wall in this plan. An area under the pantry window is shown covered by a grating, to prevent a person descending the steps from the breakfast porch from accidentally falling into the area. Gratings are sometimes placed over all areas to prevent accidents.

An area containing steps to the basement is situated at the rear of the building, and, as shown in the First-Floor Plan, there is a pipe railing on the top of the outer wall to guard against accidents. The steps are made of concrete and surfaced with rich cement mortar. As shown on the Basement Plan, the walls of all the areas are made of concrete.

84. Section Lines.—Section lines *A–B* and *C–D*, shown on the floor plans, indicate that sections have been drawn on these lines. These sections have been drawn to

show what would appear to a person looking in the direction indicated by the arrows at the ends of the lines. Thus, on the section on the line *C–D*, called the Longitudinal Section, will be seen the building as it would appear if all the parts in front of the line *C–D* were removed. The use of such sections has been pointed out in the study of the First-Floor Plan. The section lines are taken through parts of the building that require further illustration, and need not be exactly over one another in the various plans.

85. Dimensions.—The subject of dimensions was discussed in *Reading Architects' Blueprints*, Part 1, and it will be a very useful exercise to study carefully the dimensions given on the blueprints. The various lines of dimensions in any one direction should be added to see if the totals agree.

86. Indications of Construction.—The indications of construction shown on the First-Floor Plan are those referring to the size, spacing, and direction of the joists. The Basement Plan shows girders that support the first-floor joists and the partitions on each side of the hall. On the Longitudinal Section these girders appear as three beams bolted or spiked together, with cleats on the sides of the girders to support the joists. The girders are supported on 5-inch pipe columns, which, as shown in the Basement Plan, are supported on concrete footings 2 feet square and 12 inches thick. In the Longitudinal Section, a section is shown through the header at the living-room hearth at *d*, and bridging between the floor joists is indicated at *e*.

87. A framing plan, which gives the arrangement of the joists and girders in the first floor, will be shown further on. The chimneys should be built from larger-scale details.

88. In the foregoing study of the First-Floor Plan it has been found necessary to refer to several of the other drawings in order to understand clearly the indications on the First-Floor Plan. This serves to illustrate the dependence

of one drawing on the other, and also the method of referring to the various prints to obtain information supplementary to that given on any one plan.

SECOND-FLOOR PLAN

89. General Description.—The indications on the Second-Floor Plan are in many respects similar to those shown on the First-Floor Plan. The indications for the outside walls, for the partitions, the double-hung windows, the doors, the lights, and the floor construction are just the same as for like features on the First-Floor Plan. Dimensions are also indicated in the same manner. The new features that are conspicuous in the Second-Floor Plan are the bathrooms.

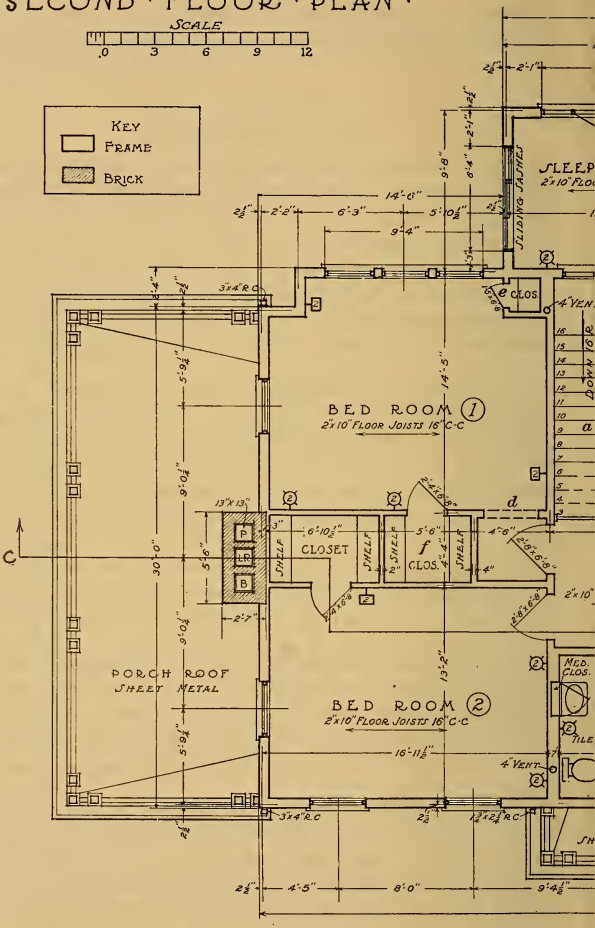
90. Rooms on the Second Floor.—The second floor is generally devoted to the sleeping accommodations for the family and guests. The bedrooms are marked on this plan by numbers *1*, *2*, and *3*. A servant's bedroom is also shown on this floor and is marked *1*, this number indicating that there are one or more additional servant's bedrooms elsewhere on these plans.

There are two bathrooms for the family and one for the servants, and closets connected with all the bedrooms. A sleeping porch is also provided at the rear of the main hall.

91. Bedrooms.—The requirements for a bedroom are: Proper space for the bed, the bureau or dresser, and one or two chairs. There should be a suitable closet for clothing, and there should also be access to a bathroom, without the necessity of passing through another bedroom or living room.

92. Bedroom No. 1 is reached through a vestibule. Between the vestibule and the bedroom is an arched opening, as indicated by the broken lines at *d*. A small closet *e* is built in the corner of this room to make the bay-window effect on the north side, and so that the windows will be symmetrical with the bay. Another closet *f* with two shelves, is shown on the south side of this room. Two lighting out-

SECOND FLOOR PLAN



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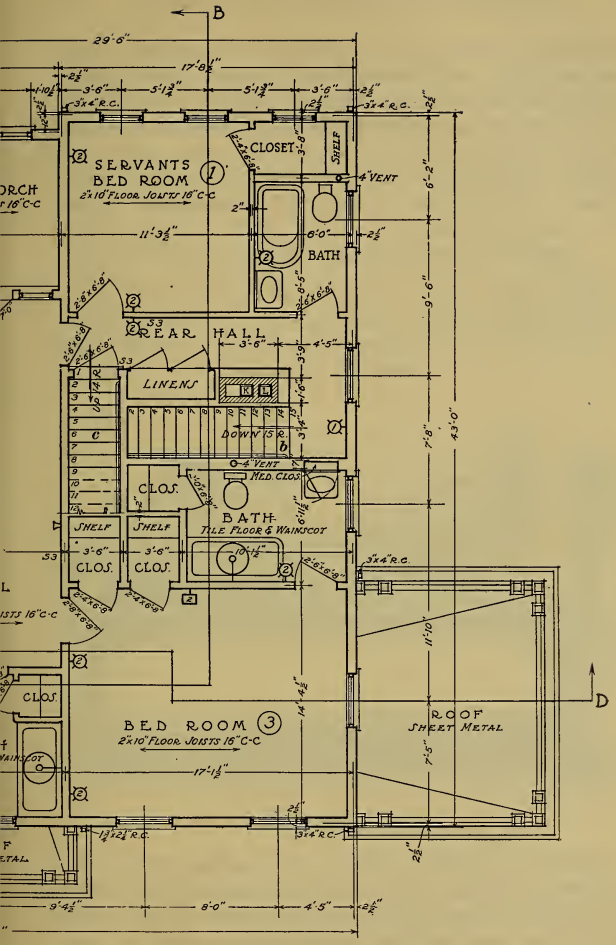

B
29'-6"
17'-8½"
SERVANTS BED ROOM (1)
2"x10" FLOOR JOISTS 16" C-C
CLOSET
SHELF
4" VENT
BATH
REAR HALL
LINENS
DOWN (5 R.)
MED. CLOS.
CLOS.
BATH
TILE FLOOR & WAINSCOT
SHELF
SHELF
CLOS.
CLOS.
3'x4" R.C.
BED ROOM (3)
2"x10" FLOOR JOISTS 16" C-C
ROOF
SHEET METAL
D
17'-1½"
8'-0"
4'-5"

lets are indicated on the south wall. They are located so that a bureau can be placed between them. The best space for the bed is against the right wall. An electric outlet is placed conveniently for a table which can be placed at the head of the bed. Another base outlet is provided at the left side of the bay for a floor lamp that can be used for reading. Similar arrangements are shown in bedroom No. 2 and in bedroom No. 3. Bedroom No. 3 is the owner's room, and is provided with a private bathroom and two closets.

93. The servant's bedroom No. 1 has a closet in which a window is shown. While marked on the plan as a servant's room, it may be found convenient at times to use this room for members of the family or guests.

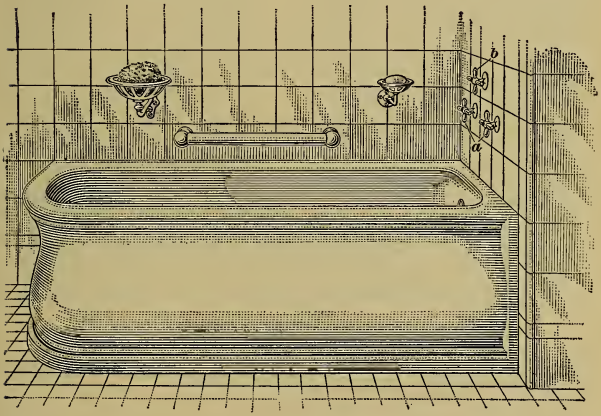


FIG. 13

94. Bathrooms.—The owner's bathroom contains a bathtub built against two walls. The small ring represents a spray, and the large circle the ring to hold the rubber curtain. A basin is shown with a medicine closet over it, and a water closet with a low-down tank is indicated. A bathtub installed in the manner indicated is shown in Fig. 13, and in

Fig. 14 are shown a shower, a basin, and a water closet of the kinds indicated on the plan.

The floor and wainscoting are to be of tile, as indicated by the notation on the floor. The closet opening from this bathroom will be convenient for linen and bathroom supplies. The door to this closet has a glass mirror in front of a wood

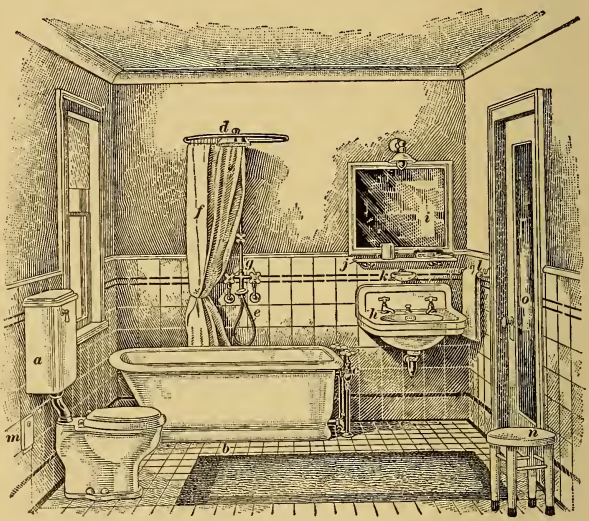


Fig. 14

panel. This is seen in the Transverse Section, which shows a section through the bathroom.

95. The bathroom opening on the hall is similar to the owner's bathroom, and a view of this is given in the Transverse Section. This view shows the basin over which is a medicine closet with a mirror in the door. A pipe, marked *4″ Vent*, is shown in connection with each of the bathrooms, and these pipes are placed as close to the water closet as the framing of the building will permit.

96. In the accompanying Fig. 14 is shown a general view of a typical bathroom in which a water closet with a low-down tank *a* is used. At *b* is a bathtub, with the supply and waste pipes at *c*. At *d* is the rubber ring that supports the rubber curtain *f*. Inside this ring is a shower that sprays the water over the bather standing in the tub. At *e* is a rubber tube with a spray on the end through which water can be sprayed. At *g* are mixing valves which regulate the amount of hot or cold water that is to be sent through the sprays. At *h* is a basin of the integral, or one-piece, type. At *i* is a mirror, and at *j* a glass shelf for holding toilet appliances. A soap dish is shown at *k*, and a towel rack at *l*. At *m* is a box to hold toilet paper, at *n* a stool, and at *o* a mirror set into the door. This arrangement represents a complete bathroom similar in most respects to those indicated in the building shown in the blueprints.

97. An interesting feature in connection with the construction of the tile floor is illustrated at *q* in the Transverse Section. In Fig. 15, which is a section through the floor con-

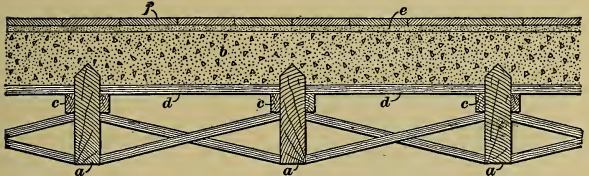


FIG. 15

struction, the joists *a* are shown cut down and pointed so as to separate the concrete *b* as little as possible. Cleats *c* are nailed to each side of the joists, and boards *d* are laid on the cleats. Upon the boards the concrete *b* is poured and on this is laid and leveled a bed of rich cement mortar *e* on which the tile *f* are laid.

98. In the servant's bathroom a water closet having a high tank is indicated. Such a fixture is illustrated in Fig. 16. In this figure the water-closet bowl is shown at *a*, the high

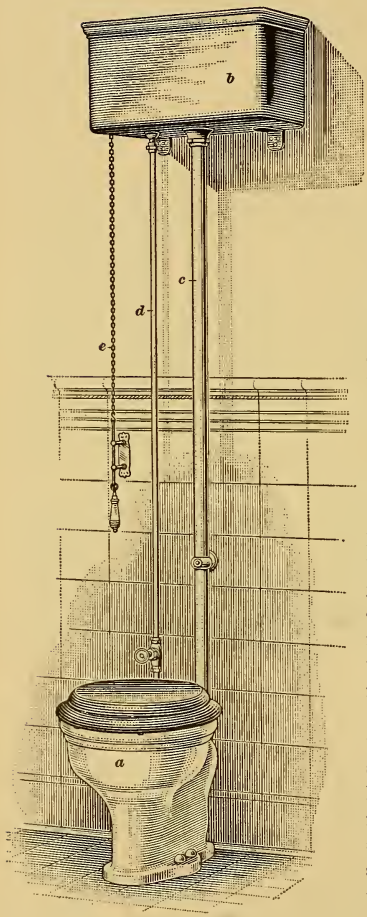
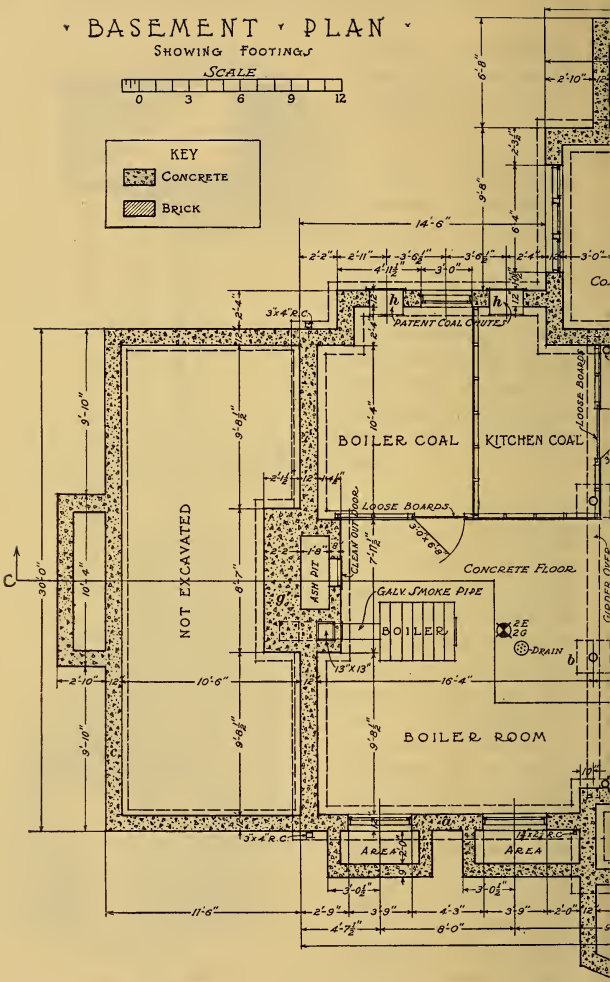


FIG. 16

tank at *b*, the flushing pipe at *c*, the water supply at *d*, and a chain pull at *e*.

99. Sleeping Porch. — The sleeping porch is enclosed on two sides by windows. The group of windows on the west side consists of sliding sash and the one on the north side consists of a casement window with fixed sash on either side.

100. The roofs of the front porch, side porch, and the breakfast porch are seen on this plan. These roofs show gutters around the outer edges and railings with newels inside the gutters. The slanting lines represent the changes in direction of the roofs, the roof areas all sloping so as to bring the eaves level all around. The roofs are covered with sheet metal, which should be carried up on the sides of the newels so as to make a rainproof joint.



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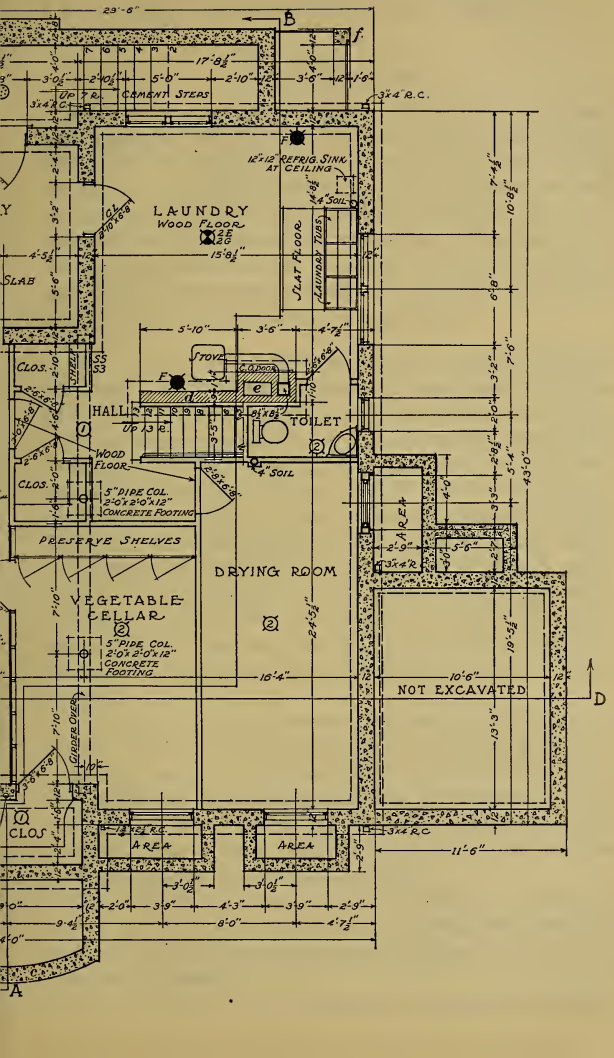

LAUNDRY
WOOD FLOOR
FLAT FLOOR
LAUNDRY TUBS
12"x12" REFRIG. SINK AT CEILING
SOIL
STOVE
COUPLING
HALL
UP 13 R
TOILET
WOOD FLOOR
5" PIPE COL. 2'-0"x2'-0"x12" CONCRETE FOOTING
PRESERVE SHELVES
DRYING ROOM
VEGETABLE CELLAR
NOT EXCAVATED
AREA
CEMENT STEPS
UP 7 R
CLOS.
SLAB
CLOSET
GUTTER OVER
23'-6"
17'-8½"
15'-8½"
5'-10"
3'-6"
4'-7½"
10'-6"
11'-6"
8'-0"
9'-4½"
4'-7½"

BASEMENT PLAN

101. General Description.—The Basement Plan is very important, as it shows the part of the building that is built first. It should be very carefully marked with the dimensions. If these dimensions are not correct the building above will not fit the foundations and may have to be changed in the drawing and execution. This plan should have overall dimensions on it, such as 44′ 0″ for the front and 43′ 0″ for the side. These overall dimensions make it easy to lay out the building on the ground.

102. Walls and Partitions.—The walls shown in this plan have a very different appearance from those in the First-Floor Plan. They are more substantial, thicker, and marked with the indication for concrete. In general they are 12 inches in thickness. The broken lines 6 inches each side of the walls indicate the footings. These footings are shown clearly in the Transverse Section. Some of the walls that have lighter loads do not require footings if the soil has a good supporting value. Consequently the walls of the steps and porches have no footings indicated. The same is true of the walls of the areas. As a matter of economy, the walls of these parts are not carried down so deep as the main walls, as it is only necessary to carry them down below the point to which frost reaches.

Thus, on the South Elevation, the depths to which the different walls are carried are shown by broken lines. The foundation walls of the front steps *b* and the areas are carried down only to the depth of 3 feet 6 inches; this distance being below the level to which frost penetrates in most climates. The walls of the side porch and of the breakfast porch are carried down to the same level.

The walls of the main part of the building, however, are carried down so that the tops of the footings are from 4 feet to 6 feet below the finished top of the cellar floor, as at *a* in the South Elevation.

A careful study of the elevations in conjunction with the

Basement Plan is strongly recommended, and will result in a clear understanding of the plan.

103. In the Basement Plan a brick foundation wall is shown for the kitchen chimney. The brickwork of this chimney will show in the laundry, although this brickwork may be plastered if desired. A footing is shown by broken lines under this chimney and will be formed of concrete.

Concrete footings are indicated under the 5-inch pipe columns that support the girders upon which the first-floor joists rest.

104. Partitions.—The partitions shown in the basement, around the drying room, laundry, hall, and closets, are 4 inches in thickness, and are built with the studs set flatwise, and may be covered with plaster or wood on each side. The partition on the west side of the vegetable cellar is of studding with boarding on the left-hand side. The partitions around and separating the coal cellars are also of studding boarded on one side.

The coal bins are fitted with doors that are shown on the Longitudinal Section to be batten doors. The doors in the plastered partitions are paneled doors.

105. Floors.—The floors of the basement, with the exception of the laundry, hall, and closet floors, are of cement finish on a concrete base. The floors of the laundry and hall are of wood which is secured to beveled sleepers as shown in the Transverse Section.

106. Laundry.—A laundry stove is indicated with the stove pipe running into the flue. This flue is shown lined. The space *e*, which forms the flues above the basement, is left hollow to save brickwork. The stove would not be furnished by the contractor, however, unless so stated in the contract or specifications.

A set of three laundry tubs, or trays, is shown upon an elevated slat floor. These tubs will be similar to the set of tubs shown in Fig. 17.

A sink is indicated by dotted lines, and into this is drained the water from the melting ice in the refrigerator.

A fuel-gas outlet is shown on the north wall, which is to supply a gas iron or a stove to heat irons. A second fuel-gas outlet is shown near the chimney to supply a gas stove or iron heater, or possibly a hot-water heater.

A cast-iron clean-out door is indicated in the chimney at the bottom of the laundry flue, by the letters *C. O. Door*. By opening this door, the flue can be reached for cleaning when necessary.

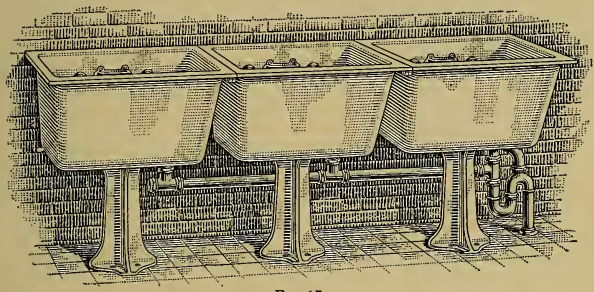


FIG. 17

107. A toilet for the use of the servants is provided in the basement, and contains a low-down tank water closet, such as shown in Fig. 11, and a corner wash bowl.

108. Area steps are shown leading from the grade to the basement. These steps are formed of cement-finished concrete. In the middle of the slab in front of the entrance door is a drain which is designed to carry away any water that might otherwise collect at the bottom of the steps. A door sill and step prevent water from washing in on the basement floor in case this drain should overflow. A drain is shown in front of the boiler and is intended to take away any water that might otherwise gather on the cellar floor.

109. Drying Room.—The drying room is a convenient place in which to dry clothes in damp or rainy weather. This

room is shown in the Longitudinal and the Transverse Sections and is finished with plain walls.

110. Vegetable Cellar.—The vegetable cellar is a place to store vegetables, preserves, canned goods, and other foodstuffs. The dark closet connected with it can also be used for preserves that might be injured by the action of light. The fronts of the preserve closets or shelves are shown in the Longitudinal Section. Wire-mesh doors are shown which can be locked. The dark closet can also be locked if desired. The drying room, vegetable cellar, and the dark closet are provided with electric-light outlets.

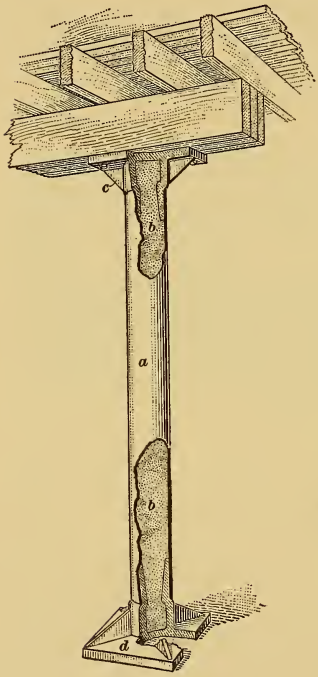
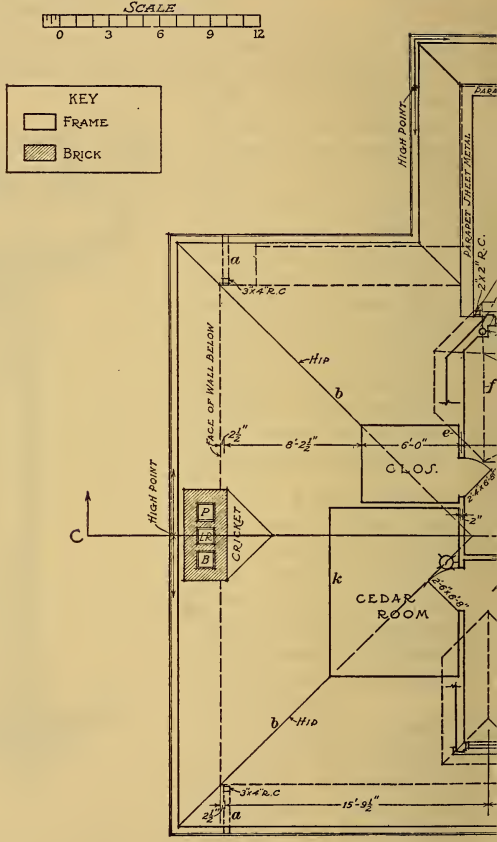


FIG. 18

111. Pipe Columns. The pipe columns are iron or steel pipes provided with suitable caps and bases. The pipes are sometimes filled with concrete, which makes the columns stronger than they would be if not filled.

A standard concrete-filled pipe column is shown in Fig. 18. It consists of a steel shell *a* filled with concrete *b*. A cap *c* and a base *d* of cast iron are fitted to the shell and are designed to support the load on the top and to spread the load on the footing. A 5-inch concrete-filled column such as is shown will support about 20 tons weight.

THIRD (ATTIC) FLOOR PLAN



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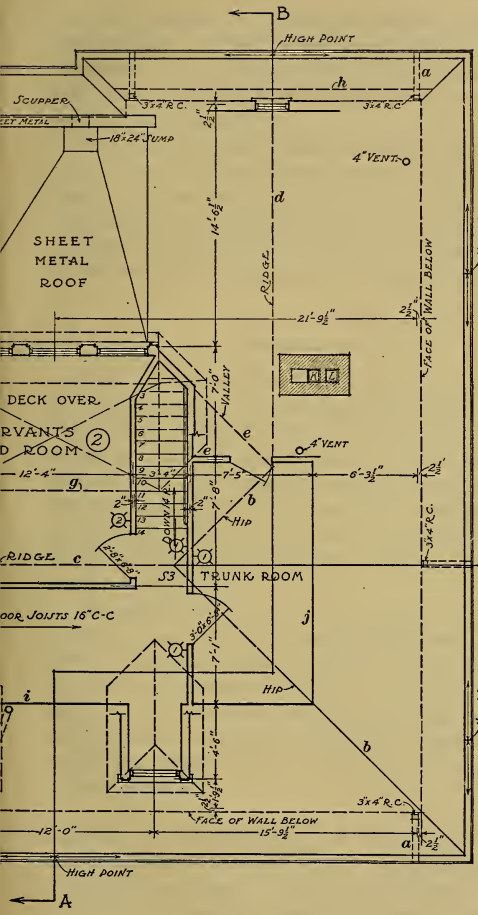

B
HIGH POINT
a
h
SCUPPER
3"x4" R.C.
3"x4" R.C.
18"-24" JUMP
4" VENT
d
14'-6½"
RIDGE
HIGH POINT
SHEET METAL ROOF
21'-9½"
2½"
FACE OF WALL BELOW
DECK OVER
RVANTS
D ROOM
2
12'-4"
g
7'-10"
VALLEY
e
4" VENT
6'-3½"
2½"
7'-5
7'-8"
b
HIP
RIDGE
c
3"x4" R.C.
D
53 TRUNK ROOM
OOR JOISTS 16"C-C
j
7'-1"
HIP
HIGH POINT
i
4'-8"
b
3"x4" R.C.
FACE OF WALL BELOW
12'-0"
15'-9½"
a
2½"
HIGH POINT
A

112. Boiler.—A boiler for heating the house is shown and marked. A pipe connecting it with the chimney is also indicated. This boiler would in most cases be supplied by the general contractor, although sometimes provided by a separate contractor.

Two coal bins are indicated, one for boiler coal and one for coal for the kitchen range, the laundry stove, etc. Openings to the coal bins are also shown, and in the Longitudinal Section is shown a batten door at *n* for one of these openings. The space marked *Boiler Room* is convenient for the storage of fire wood, also as space for ash cans, etc.

THIRD-FLOOR PLAN

113. General Description.—The plan of the third floor differs very much in appearance from the plans of the other floors. The fact that there is only one room in this entire floor would suggest that space has been wasted. An inspection of the Transverse Section, however, will show that the roof is so close to the floor that there would not be sufficient height for a man to stand over a great part of the floor. Most of the space is therefore of little use except for trunk space, closets, etc.

The requirements of the owner call for only one bedroom on this floor, and this is the servant's bedroom No. 2. In addition to this room, there is space for a trunk room and for a cedar closet, the latter being lined with cedar wood, as a protection against moths, for the preservation and storage of furs, blankets, and spare clothing. There is space enough under the middle part of the roof for the accommodations shown on the plan.

114. Another peculiarity of this plan is that a plan of the roof has been combined with it. The eaves, hips, valleys, and ridges are shown. The parts of the roof below the plane at which the plan is shown are drawn in solid lines. The parts of the roof that are above this plane are in broken lines. As the plan is shown at a plane about 4 feet above the floor,

the roof below this plane would naturally appear on the plan. The parts of the roof that are shown by the broken lines would not appear, however, and they are therefore drawn in broken lines, which indicate the construction above. It would not be economical to show the roof on a special plan for the sake of showing these few broken lines, consequently they are included in this plan.

115. Eaves and Gutters.—This plan may be considered first as a roof plan. The three lines shown all around the outer edge of the plan show the gutter into which the roof drains. At certain points goosenecks *a* are shown by broken lines leading to the rain conductors. The bottom of the gutter is sloped downwards toward these goosenecks. The highest points in the gutter are marked *High Point*, and the arrows in the gutters show the direction in which the water flows. The diagonal lines at the projecting corners indicate the hip rafters *b*, which meet at the ridge *c*. A ridge terminating in the north gable is shown at *d*. The diagonal lines *e* indicate valleys.

The broken line marked *Face of Wall Below* represents the outer face of the wall of the second story. The outside face of the studs is $2\frac{1}{2}$ inches inside this line, and the dimensions on the plan are taken from the stud line, in the same manner as in the first- and second-floor plans.

116. Flat Roof, or Deck.—A flat roof, or deck, is shown to the north of the bedroom. The sloping lines on this roof represent valleys caused by changes in the slope of the roof. These valleys guide the water to the *sump*, which is a shallow box, seen in the North Elevation. From the sump the water runs out through a hole in the parapet, called a *scupper*, onto the roof and thence into the gutter. A parapet wall extends around two sides of the deck and is covered with sheet metal. The tops of these parapets merge into the sloping roof. These parapets are visible in the North and West Elevations.

117. Another flat deck occurs over the servant's bedroom No. 2 and is indicated by the rectangle *f g* and the

diagonals shown in broken lines over the bedroom. Neither this deck, nor the one just described, are visible from the ground. As they are practically flat they must be covered by tight roofs, and properly drained by means of leaders, as shown on this drawing.

118. Roofs of Dormer Windows.—The roofs of the dormer windows are shown in dotted lines entirely, as the plan is taken on a plane passing through the windows below the roof. The projection of the roof of the north gable is shown by dotted line *h*.

119. Walls and Partitions.—The outside walls of the bedroom on the north side are stud walls covered with plaster, or stucco, similar to the main walls of the building. In this wall are indicated three double-hung windows.

Around the dormer windows also are exterior walls, the front walls being occupied by windows, and the side walls covered with shingles. This treatment will be seen in the Transverse Section. Between the dormers, at *i* in this plan, a single line is shown which represents a wall that is plastered on the inside only. Similar lines are shown enclosing the cedar room, the closet of the bedroom, and the trunk room. All these lines indicate the plaster face of partitions that are plastered on one side only. An examination of the sections will show the details of these partitions.

120. Thin partitions are indicated around three sides of the bedroom, and on one side of the trunk room and cedar room. These partitions are formed by placing the studding flatwise and plastering on both sides.

The walls at the backs of the cedar room, closet, and trunk room, as at *j* and *k*, are only about 4 feet 6 inches high, as will be seen in the sections. This is a sufficient height for the purposes for which these spaces are used. The full ceiling height extends over about one-half of these areas, so that there is sufficient headroom to permit people to enter them.

121. Stairs.—The service stairs reach the third floor, as shown, by fourteen risers. These stairs are lighted by

direct light from the front dormer window. At night time a light at the head of the stairs is useful and can be operated by a three-way switch. By the use of this switch the light can be turned on at the second floor and turned off after the servant has reached the third floor, and vice versa.

A hand rail is shown by the double line at the right side of the stairs.

122. Dimensions.—It is not necessary to show many dimensions in this plan. The dormers are located so as to be symmetrical with the main axis of the south elevation. The distance of the face of the dormer from the front wall is also marked.

The rear wall of the bedroom is located with reference to the main walls of the second story, and the bay should be placed at the central transverse axis of the building, so as to be symmetrical with respect to the ridge, as seen in the north elevation.

The walls, or partitions, enclosing the stairs are built so that the faces against the stairs are the same as those in the partitions below in the second story.

The partitions on one side, as at *j* and *k*, can be located with sufficient accuracy by scaling off or measuring with a rule.

The chimneys will be carried up directly over the chimneys shown in the Second-Floor Plan.

SOUTH ELEVATION

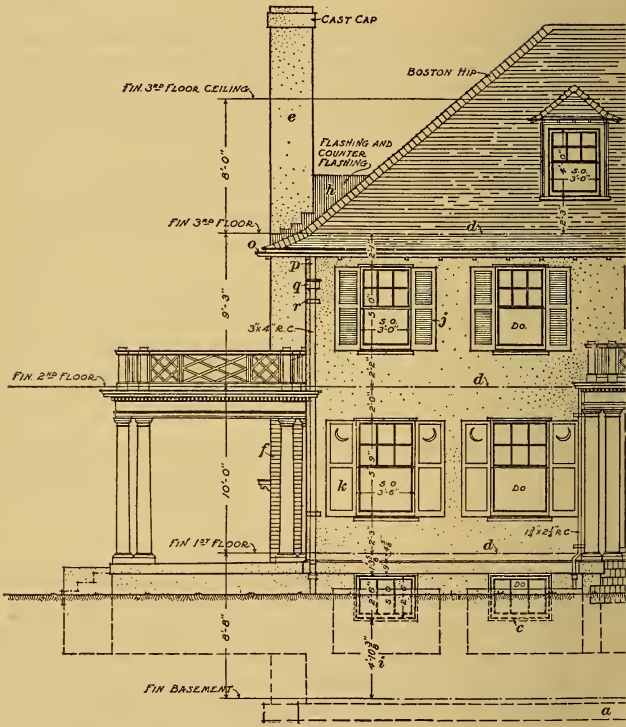
123. Elevations.—The purpose of the elevations is to show the sizes, arrangement, and relation to each other of the features of the exterior of the building. Elevations show the doors, windows, walls, roofs, porches, and chimneys, also the levels of the floors, and the finished level of the ground at the building; they also give the heights of the various stories, sizes of window openings, etc.

124. Walls.—The walls of the building are shown as plain surfaces marked with dots over part of the surface.

SOUTH ELEVATION

SCALE

0 3 6 9 12



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CAST CAP
h
FLASHING AND COUNTER FLASHING
g
Do.
ROOF
o
p
q
r
3"x4" R.C.
Do.
Do.
e
Do.
Do.
n
l
12"x12" R.C.
m
Do.
Do.
CONCRETE
GRADE
b

This indicates a stucco finish, which should also be described in the specifications. A similar stucco finish is indicated on the chimneys.

In the south elevation, a water-table *m* is shown extending across the elevation, and is dotted to indicate that it is stuccoed. Certain portions of this water-table, as at the side porch and the breakfast porch, are of solid concrete. The indications for stucco and concrete are similar. The wall below this water-table is similar in appearance to the wall above, but in this case it is a concrete wall below the water-table, as indicated by the notation on the wall. In a case like this, the specifications should be consulted to ascertain the character of the walls of the house. The plans should also be examined, and it will be seen that the Basement Plan shows a concrete wall, and the First- and the Second-Floor Plans indicate a frame wall. A frame wall in the plan, dotted in the elevation, shows clearly that this wall is stuccoed. The specifications will verify this conclusion.

In the elevations the walls below the grade line are indicated by broken lines. The walls supporting the porches, and the area walls, are started below the frost line, or about 3 feet 6 inches below the finished grade, and the walls of the building itself are carried down below the basement floor and are supported on footings lettered *a* in the South Elevation. These footings extend 6 inches each side of the wall and are 12 inches in thickness.

125. Windows.—The windows in the first story are typical double-hung windows with shutters. The sash opening is marked *S. O.* on one of the windows, and the other windows are marked *Do.*, or ditto, to indicate that the same notation applies to them all. The horizontal dimension of the sash opening is shown as *3′ 6″* and the vertical dimension *5′ 9″*. The upper sash is shown divided into six lights, while the lower sash is in one light. The shutters are made with solid panels, a small crescent-shaped opening being made in the upper part of each.

The windows in the second story are also double-hung, and

have blinds with movable slats instead of shutters. The window over the entrance porch is not so high as the others as it is in a bath room. The size of the sash opening is given for these windows in the same manner as for those in the first story.

The windows in the dormers are double-hung windows, and the size of the sash opening is given. The basement windows are single-sash windows. The parts of the building above the ground level, or grade, are shown by solid lines and the parts below are in broken lines.

A double-casement window *n* is shown in elevation. The First-Floor Plan shows that this window opens outwards, and that the windows on each side also swing outwards.

126. Porches.—The entrance porch, as was noted in the discussion of the plans, is decorated with pilasters, cornice, and railings. The breakfast porch is treated in the same manner, while the side porch differs only in having columns instead of pilasters. These decorative features are generally shown at a larger size in scale details and in full-size details, from which they are constructed.

The entrance porch contains the entrance door *l*, which is surrounded on three sides with sash forming side lights and head lights, or transoms. This feature is also built from scale details and full-size details.

127. Roof.—The roof *g* is marked *Shingle Roof* and the horizontal lines indicate shingles. The hips are finished in what is known as "Boston hip" fashion. The hips of the dormers are finished similarly. A slate roof would be indicated in the same manner as a shingle roof, but would be marked *Slate Roof*. At the eaves are shown the gutter *o*, and two rain conductors marked *3″×4″ R. C.* The water runs from the gutter through goosenecks *p* into the conductor head *q*. The conductor is held to the building by means of straps *r*. A view of a gooseneck and a conductor is given in Fig. 19. Smaller rain conductors are shown on each side of the entrance porch, and these lead off the water from the roof of that porch.

128. Chimneys.—The chimneys are shown as they come up through the roof from the second floor. At the place where they meet the roof sheet metal is indicated by vertical lines. This metal, called *flashing*, is built into the joints of the brickwork, which accounts for its appearance of being in steps, or *stepped-up*. Behind the chimney *e*, at *h*,

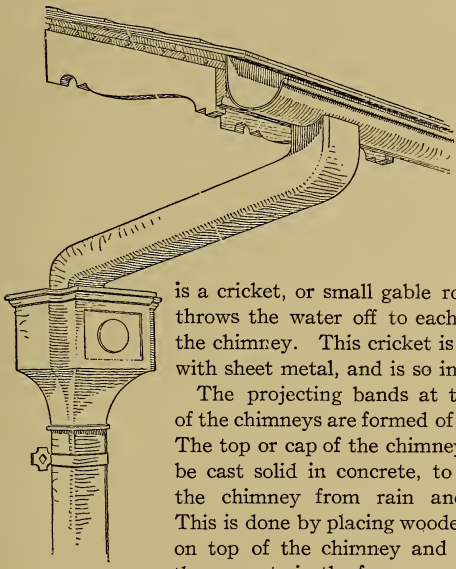


Fig. 19

is a cricket, or small gable roof, that throws the water off to each side of the chimney. This cricket is covered with sheet metal, and is so indicated.

The projecting bands at the tops of the chimneys are formed of cement. The top or cap of the chimney should be cast solid in concrete, to protect the chimney from rain and frost. This is done by placing wooden forms on top of the chimney and pouring the concrete in the forms.

129. Dimensions.—The principal dimensions shown on elevations are the story heights, as shown at the left-hand side of the South Elevation. The levels of all the floors are shown by a dot and dash line, and the distances between them are marked.

The next important dimensions are the heights of the window sills, above the floors. These are given in the line of dimensions through the left-hand windows. The distances of

the sash openings above the floors, the heights of window openings and the distances between the tops of the window openings and the floor above are marked. The height of the ceiling of the attic is also shown and its distance above the third-floor line is given.

WEST ELEVATION

130. Principal Features.—From the explanations that have already been given of the South Elevation and the other drawings, the indications on the West Elevation will be easily understood.

The main feature of the West Elevation is the elevation of the living-room wing. As was noted while considering the First-Floor Plan, this elevation of this wing is symmetrical with reference to an axis line through the middle of the chimney, or through the living room.

The walls are shown as in the South Elevation, also the stucco finish of the chimneys. The foundations of all the porches and steps are shown at the proper depths. The footings of the main walls of the building are properly shown. The steps are shown in broken lines, as they are back of the cheeks.

131. Chimney.—An elevation of the fireplace in the side porch is given, and the indications show that the fireplace will be faced with some fancy or ornamental brickwork. The flues, which are shown by means of broken lines, are brought over so as to be symmetrical with the axis of the wing to permit the chimney itself to be made symmetrical.

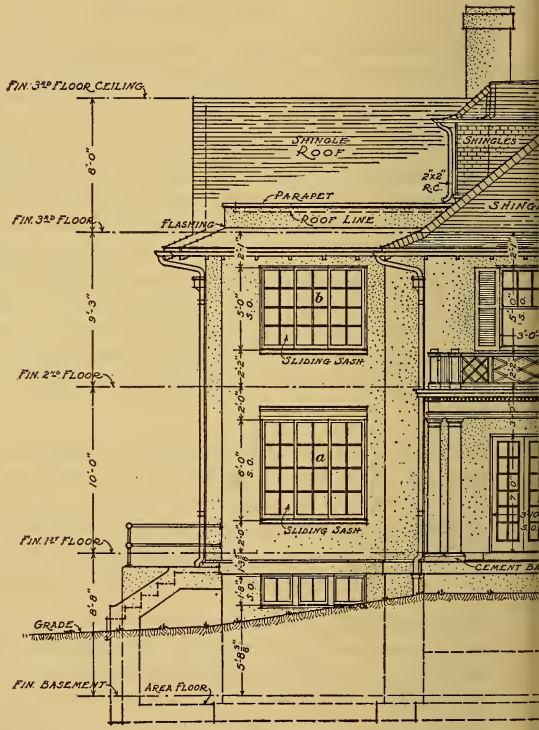
132. Windows.—The windows of the living room are French windows, that give access from the living room to the side porch. The windows over them in the second floor are typical double-hung windows, and the sash openings are properly marked.

Sliding windows *a* and *b* are shown on the rear porch and on the sleeping porch above, while single, hinged sash appear in the wall of the basement.

WEST ELEVATION

SCALE

0 3 6 9 12



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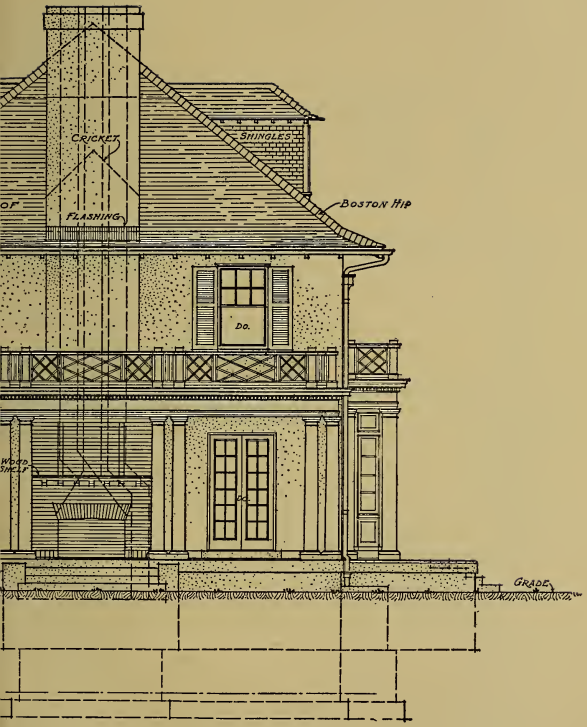
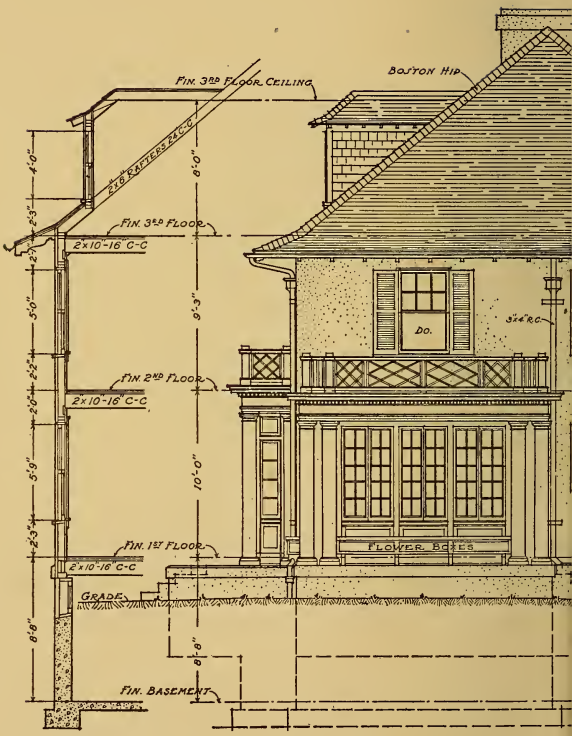

CRICKET
SHINGLES
OF
FLASHING
BOSTON HIP
DO.
WOOD SHELF
DO.
GRADE

EAST ELEVATION

SCALE

0 3 6 9 12



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FLASHING & COUNTER FLASHING
INGLE ROOF
Do.
3'-0" S.D.
Do.
LATTICE
3'-0" S.D.
Do.
Do.
GRADE
a
b
c
d
e

133. Roof.—The roof is shown as a shingle roof with Boston hips. The gutter and the brackets under the eaves are indicated. In this elevation the goosenecks are shown extending from the conductor to the gutter, in graceful curves.

The parapet around the flat roof above the sleeping porch is also shown and the roof behind the parapet is indicated by a broken line. A cricket, seen at *h* in the South Elevation, is shown behind the chimney in this elevation by broken lines. The object of this cricket is to throw the water to each side of the chimney, and to prevent the formation of a pocket that would collect rain and snow.

In the West Elevation, the dormers are shown in side elevation, and are shingled on the sides in the same manner as the roof.

The roof of the side porch is what is called a flat roof, although it has a slight pitch; it is covered with sheet metal, probably tin, which is painted to protect it from the weather. The roof over the sleeping porch is also flat and likewise covered with tin. The roof *c* over the bedroom on the third floor is treated in the same manner.

The roof of the side porch is drained by a gutter which leads to the conductors shown on each side of the living-room wing.

134. Dimensions.—The necessary dimensions showing the story heights and the locations of the windows with reference to the floors are given at the left side of this elevation.

EAST ELEVATION

135. General Features.—The East Elevation presents very little that has not already been discussed in the study of the South and the West Elevations. The walls, foundations, chimneys, and windows, are indicated in the same manner as those already described. A mullion window is shown in the kitchen. This mullion window consists of two double-hung windows having a common weight box between them.

The sills of the kitchen windows are kept higher than usual in order to be above the drain board of the sink; and the pantry windows are, for the sake of appearance, kept at the same height. Single-sash casements are shown in the basement under the kitchen window, while a double-hung window is shown under the pantry window. This window is in the drying room.

Side views of the front steps and of the steps from the breakfast room are shown.

136. Service Porch.—The square posts supporting the building over the service porch are clearly shown in this elevation, together with the rails and balusters between them. A lattice is shown which screens the porch from view, and may be used to support a vine. A flight of steps is shown with rails, balusters, and newels, also a lattice of slats beneath. A pier supporting these steps is shown in dotted lines and will be seen in plan at *f* in the Basement Plan.

137. Stairs.—An indication of the service stairs is shown in the East Elevation, where the entire series from basement to attic is shown, starting at *a* and ending at *f*.

138. Breakfast Porch.—On the front and side of the breakfast porch flower boxes are indicated under the windows. These boxes are shown supported on brackets. All this work will be executed from scale and full-size drawings that will be prepared by the architect later on.

On the sheet with the East Elevation is shown a section taken through the front, or south, wall of the building. This section is shown for the purpose of giving a general idea of the construction, as well as to show the relation of the floor levels to the window openings. This relation is shown by the vertical line of dimensions at the left of the section.

The construction of the sill, the plate, the cornice, and the dormer window is given with sufficient clearness to permit of estimates being made. The actual construction will follow large-scale and full-size details, which will be furnished by the architect as required.

NORTH ELEVATION

SCALE

0 3 6 9 12

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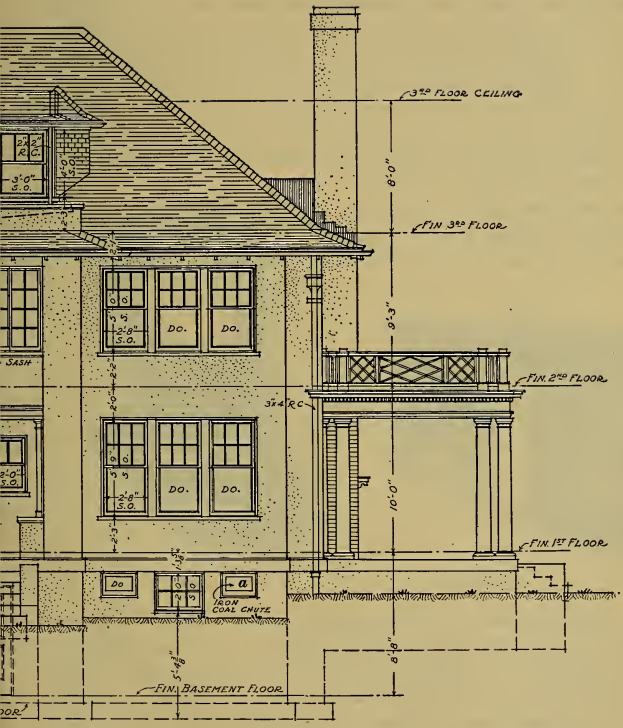

3RD FLOOR CEILING
FIN 3RD FLOOR
FIN 2ND FLOOR
FIN 1ST FLOOR
FIN BASEMENT FLOOR
8'-0"
9'-3"
10'-0"
8'-8"
DO.
DO.
DO.
DO.
3¼ RC
IRON COAL CHUTE
SASH

NORTH ELEVATION

139. General Features.—The North Elevation, which is the rear elevation, while it may be considered of the least importance, is in some respects the most interesting of all. It has a greater variety of indications than any of the other elevations: The walls and chimneys are indicated in the same manner as on the other elevations. The side porch is shown in the same manner as on the South Elevation. The breakfast porch shows the entrance doors and steps. The service porch shows the elevation of the steps. The rear porch also shows the steps in elevation. At the right the cheek slopes parallel to the steps, while on the left the cheek is brought out square, to receive the pipe railing which serves as a guard against persons falling into the basement area.

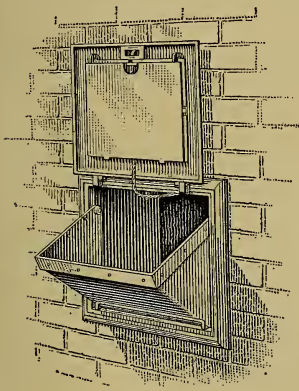


FIG. 20

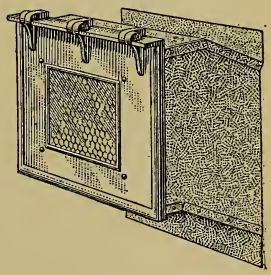


FIG. 21

140. Windows and Doors.—The windows in the living-room bay and in the bedroom No. 1, are double-hung windows. The window below, in the basement, is a single-sash window. On either side of this window are cast-iron coal chutes, Fig. 20, consisting of a cast-iron chute and a door. The door may have a light of wire glass in it if desired, as shown in Fig. 21. This door is provided with a chain by which it can be held shut from the inside.

The windows in the kitchen wing are double-hung in the upper floors and single-sash windows in the basement.

The center windows in the sleeping porch are casements with fixed sash at each side. The doors to the kitchen and the basement entry have glass panels in the upper parts, with wood panels below. The door to the basement is shown by broken lines, as the door is behind the stoop.

141. Dormers.—The dormer in the attic bedroom is shown with its three double-hung windows. The sides and the sloping roof are covered with shingles while the flat roof on top is covered with tin.

All the other indications are the same as already described, although this elevation should be carefully studied.

142. Gable.—A gable is shown over the kitchen wing. The face of the gable being vertical, it is treated in the same manner as the other outside walls. The lower slope of the roof is, however, carried across to carry out the design.

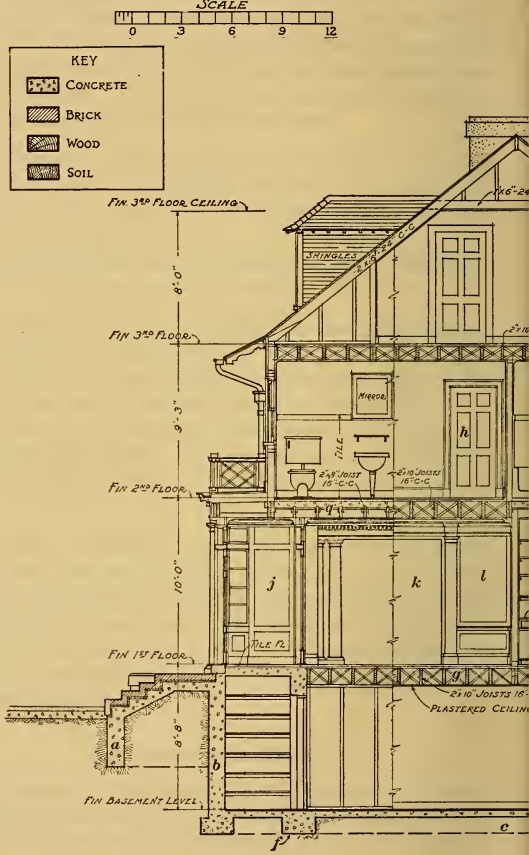
A *barge board* and moldings are shown running up the inclined edges of the gable. A small window is placed in this gable to give light in the attic space over this wing of the house.

143. Steps.—The steps to the basement from the grade, or ground level, are shown in this elevation by broken lines, and pipe rails are indicated at *b*. All the outside steps except those to the service porch are built of concrete, which is provided with reinforcement as would be shown in details that are generally furnished by the architect after the working drawings are completed.

TRANSVERSE SECTION

144. General Features.—The Transverse Section, which is taken on the line *A*–*B* of all the floor plans, has been referred to from time to time in connection with the drawings already discussed; and the indications which appear on it have been described with their relation to the corresponding indications on the other drawings in the set.

TRANSVERSE SECTION ON LINE A-B



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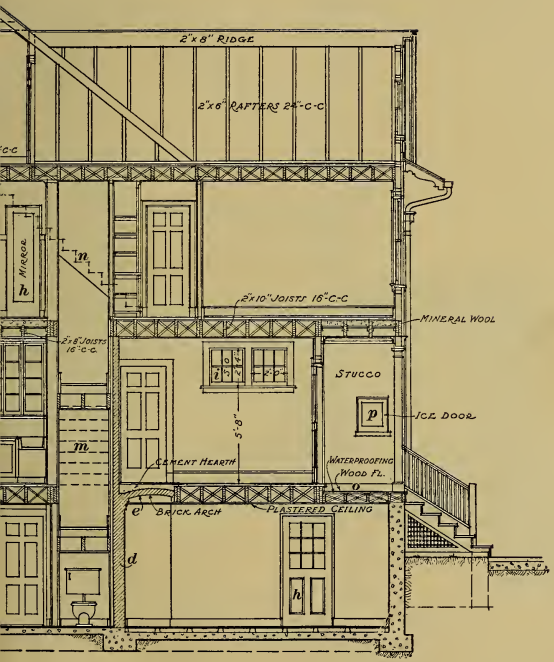
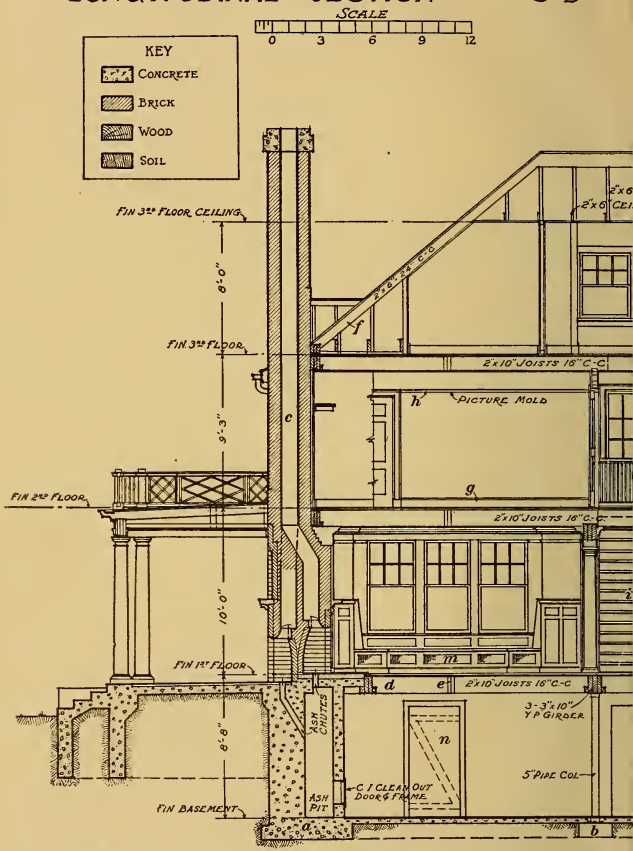

2"x 8" RIDGE
2"x6" RAFTERS 24"-C-C
MIRROR
h
n
2"x10" JOISTS 16"-C-C
MINERAL WOOL
2"x8" JOISTS 16"-C.C.
STUCCO
p
I.C.I. DOOR
5'-8"
m
CEMENT HEARTH
WATERPROOFING
WOOD FL.
o
e
BRICK ARCH
PLASTERED CEILING
d
h



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DGE
RS 24" C-C
ISTS 24" C-C
h
PICTURE MOLD
PICTURE MOLD
h'
k
g
CROSS BRIDGING
SILL
WIRE MESH
j
5" PIPE COL
b

The Transverse Section shows the building as it would appear if the part in front of the line *A–B* were removed. The line *A–B* on each floor plan is taken so as to pass through the features of which it is desired to show the construction and appearance. For this reason, examination of the section lines *A–B* and *C–D* on the plans of the different floors will show that the sections indicated are not in all cases directly one above another. Therefore, it is advisable to compare carefully the courses of the section lines on the different plans and to take notice of the construction shown for each floor in the Longitudinal and the Transverse Sections.

LONGITUDINAL SECTION

145. The Longitudinal Section differs from the Transverse Section in the fact that it is taken lengthwise of the building. It shows the parts that would be seen by a person looking from the front toward the rear of the building, as they would appear if the parts in front of the line *C–D* were removed. This section should be carefully studied and compared with the parts of the floor plans which it shows.

READING ARCHITECTS' BLUEPRINTS
(PART 3)

Serial 1842C — Edition 1

INDICATIONS USED IN DRAWINGS
(Continued)

FRAMING PLANS AND ELEVATIONS

1. The drawings such as shown in the blueprints that accompanied *Reading Architects' Blueprints,* Part 1, and which have been described in detail in Parts 1 and 2, are the ones usually furnished by the architect as the general working drawings of the building. They do not, however, supply all the information required for construction purposes, and it is necessary that the architect furnish scale and full-size details to explain more fully many of the ideas indicated on the quarter-inch-scale drawings.

One feature that is seldom shown in the form of drawings is the arrangement of the joists in the floors or the studs in the elevations. Framing drawings are seldom given for such work, all the timber construction usually being left to the judgment and experience of the building foreman. Unless there are special features or difficult problems in connection with the work, this arrangement is usually satisfactory.

Because, however, a knowledge of how floors and walls are framed will be a help in understanding plans in general, there will now be given drawings showing the framing of the first floor and the south wall of the building shown in the blueprints described in the preceding Sections.

These drawings, shown on the accompanying plates entitled Framing Plan of First Floor, and Front-Elevation Framing, are at a scale of $\frac{1}{8}$ inch = 1 foot, though they are usually made at a scale of $\frac{1}{4}$ inch = 1 foot as indicated by the legend on each.

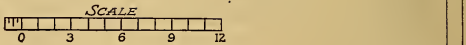
2. Framing Plan of First Floor.—In making such a drawing as the Framing Plan of First Floor, the parts of the building that support the frame, such as concrete foundation walls, pipe columns, and the chimneys, are first drawn in thin, or faint, lines. Next are shown all the openings between the basement and the first floor, such as those for stairs, chimneys, flues, floor registers, hearths of fireplaces, etc. When all these openings are drawn the framing around them is laid out.

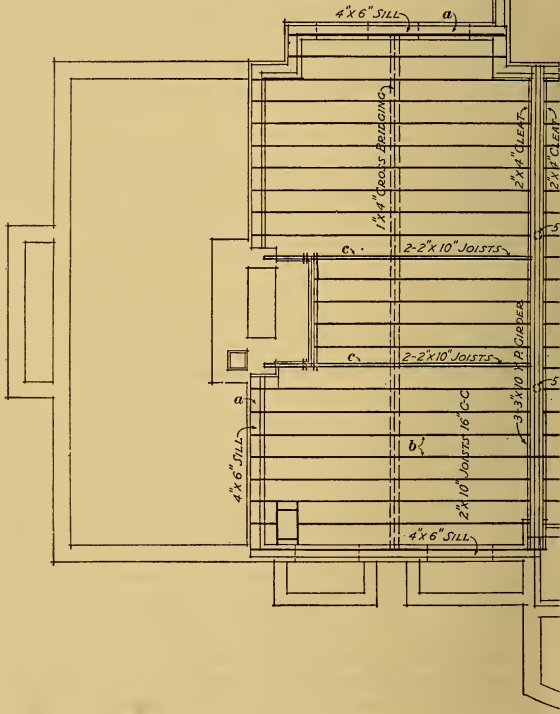
It will be seen that on each side of the living-room fireplace the joists are doubled, forming trimmers *c*. If these have a bearing on a chimney, the chimney must be so arranged that the ends of the trimmers will be distant not less than 8 inches from any flue or fireplace, in order to avoid danger from flame and heat.

A header *i* is supported on the trimmers by means of bridle irons, or iron joist hangers *j*. The header is indicated by two heavy lines which represent two 2-inch joists. The light lines on the sides of this header indicate cleats for supporting the joists *k* and the trimmer arch that extends from the chimney to the header *i*. The other ends of the trimmers rest on a similar cleat that is spiked to the girder *h*, or they may be supported by bridle irons or joist hangers attached to the girder *h*. Small openings, such as those for heat flues, do not require the joists to be doubled around them, but are framed as shown at *l*.

The girders *h*, consisting of three 3″×10″ timbers, are shown by three heavy lines. The two thin lines on the sides indicate cleats upon which the joists rest The locations of the columns that support these girders, also of the column caps, are shown by dotted lines. On the header *m* are indicated hangers which support the 2″×6″ joists of the service porch.

FRAMING PLAN · FIRST FLOOR ·






2"x6" Joists
2"x10"
3-2"x10"
2"x6" Joists
2-2"x4" Sill
4"x6" Sill
2-2"x10"
Hearth
f
2-2"x10"
Stair Well
e
d
2-2"x10"
5" Pipe Col.
Partition-Bearing
2-2"x10 Joists
g
5" Pipe Col.
3-3"x10" K.D. Cinder
2"x10" Joists 16" C-C
1"x4" Cross Bridging
2"x10" Joists 16" C-C
a
4"x6" Sill
2"x4" Sill
4" Sill
Note: All Joists to be
2"x10" 16" C-C

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When partitions resting on this floor run in the same direction as the joists, double joists should be placed under the partitions, as at *g*.

After the joists mentioned are placed in their special positions, the spaces between them are filled in with single joists, as shown by the single black lines. These joists are spaced 16 inches apart on centers, and lines of cross-bridging are put in place as indicated by the broken lines in the plan. Joists should be placed close against the outer wall studs where the walls are parallel to the joists. When the walls are at right angles to the joists, the joists should extend past the studs to the inner face of the sheathing in the walls and should be spiked to the sides of the studs.

3. Front-Elevation Framing.—The framing of the south wall is shown in the plate entitled Front-Elevation Framing. In beginning the framing, the corner posts *a* at each end are laid out and set on the sills *b*. The studs are spaced evenly across the entire front at distances of 16 inches on centers, their upper ends reaching up to the plate *g*. The studs are then cut out to accommodate the window frames, and the openings thus made are framed around with double studs as shown at *d*.

To support the wall over the vestibule, a header, or girder *e*, consisting of two 2″×10″ timbers, is located as shown; also a header *f* consisting of two 2″×6″ timbers is placed over the front-door opening in the vestibule.

The rafters, as shown, are spaced 24 inches on centers, and the dormer openings are placed so that it is necessary to cut only one rafter. The rafters are doubled on each side of the dormers, however.

The lookouts that support the eaves are placed as shown by the profiles at each end of the plate. The framing of the side porch and breakfast porch is also as shown. It will be profitable to study these framing plans in connection with the blueprints.

DETAILS

4. As has already been mentioned, besides the quarter-inch-scale blueprints of the plans and elevations, the architect will furnish larger-scale or full-size drawings, or details, for many of the parts of the building which, because of their size, form, or construction, cannot be plainly shown on the quarter-inch-scale drawings.

A selection of such details will now be considered and their indications explained. These details are generally given to the contractor in the form of blueprints, the original tracings being kept in the architect's office so that additional prints can be made at any time they are required. Some of these details will be here shown in the form of blueprints.

CELLAR OR BASEMENT WINDOW

5. In Fig. 1 is shown a blueprint of a typical detail of a cellar window. At the left, the window and nearby parts are shown in elevation, with a portion broken out of the middle as indicated by the two irregular lines, and on the right are shown sections taken at the places indicated by the lines *A-A*, *B-B*, and *C-C*.

To make plain the construction indicated in the details, Fig. 2 is given, which shows in perspective how the different parts would look if they were actually cut at the points where the sections are taken.

6. Fig. 1 is drawn at a scale of $1\frac{1}{2}'' \times 1'\,0''$, or at one-eighth the actual size of the construction. In the study of this detail, it will be good practice to measure off the various parts by use of an ordinary rule such as carpenters use. Then, since the detail shows the parts at one-eighth their actual size, each $\frac{1}{8}$ inch on the rule represents 1 inch on the detail. Thus, the sill marked $4'' \times 6''$ on the detail will be found to measure $\frac{4}{8}$ inch $\times \frac{6}{8}$ inch.

At *v* and *z* two portions of the drawing are shown at a scale of $3'' = 1'\,0''$, or one-fourth full size, in order to make

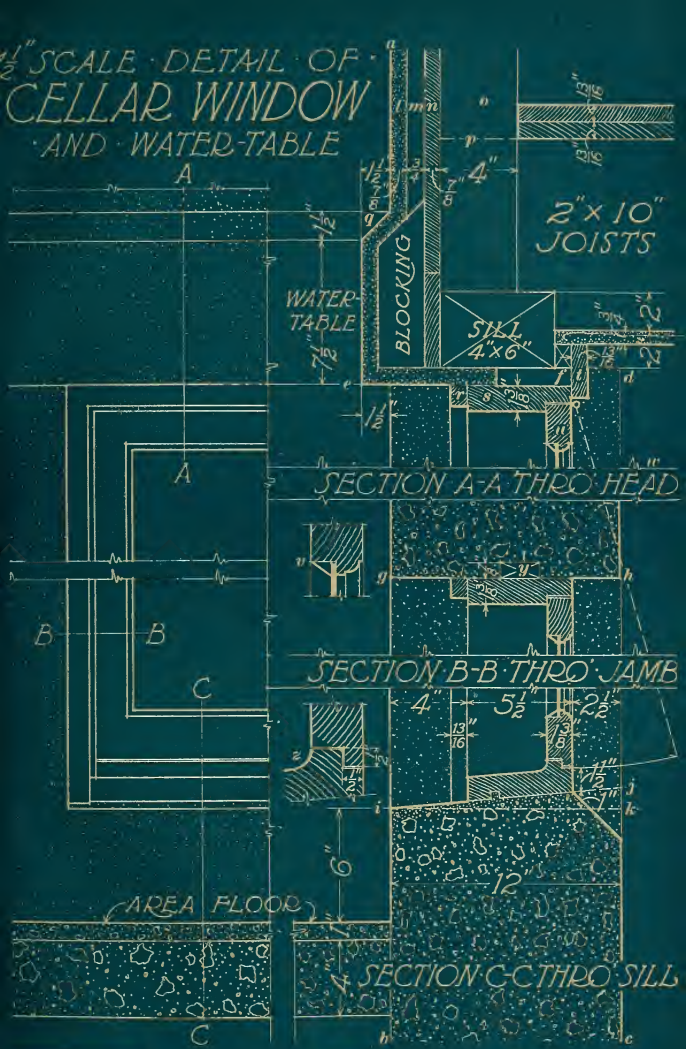

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FIG. 1

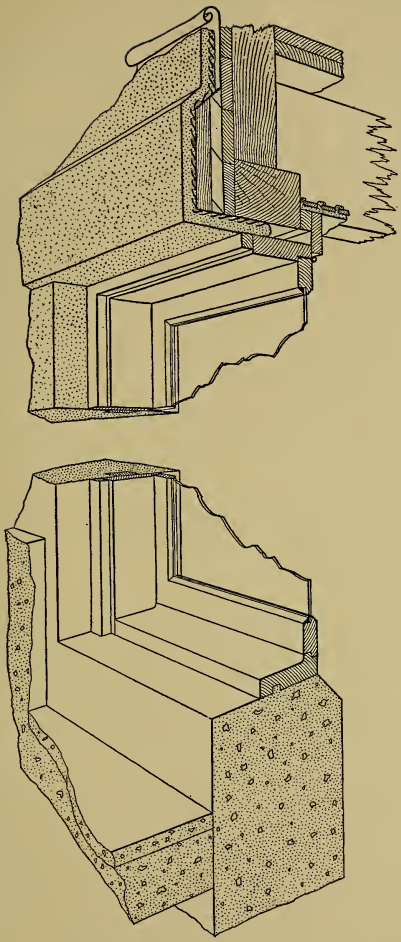


FIG. 2

clear the shape of certain parts of the detail that cannot be seen plainly at the smaller scale. In this case, each ¼ inch on the rule represents 1 inch on the detail.

7. The first impression received by a person looking at Fig. 1 is that the drawing is broken up into parts. In details drawn at large scale, only such parts are drawn as are necessary to show the construction to be used and those adjacent parts that come into immediate contact with the part that is being specially detailed.

In Fig. 1, for instance, the part of the window shown in the elevation on the left is sufficient to illustrate the entire window, and it is not necessary to show the whole pane of glass. Likewise, in the sections *A-A*, *B-B*, and *C-C*, the glass is cut off by broken lines close to the sash. This method results in less work for the draftsman, makes the drawing more compact and easily handled, and saves paper. The principle is applicable to all details and is commonly used.

8. The section *A-A* is taken through the head of the window; and since the lintel of the basement window is formed by the water-table, it is customary to show the construction of this water-table in connection with the detail of the window head.

The sill of the building is indicated to be of timber by the diagonal lines, and one of the first-floor joists is shown resting upon it. The joist is shown notched down so that its lower surface is 2 inches below the top of the sill. Since the joists are 2″×10″ in size, their tops will be 8 inches above the top of the sill. This can be verified by measuring with the rule.

Resting on top of the sill is a 4-inch stud *o*. The top edge of the joist is shown extending to the sheathing *n* on the far side of the stud, as is indicated by the broken line *p*.

The sheathing *n* is nailed to the studs and to the sill, and the furring *m* is secured to the sheathing. Upon the furring the lath is stretched to hold the stucco *l*. The water-table, which is formed of plaster or stucco, is blocked out so that it projects 1½ inches beyond the face of the wall as shown. The under side of the water-table forms the bottom of the window lintel;

the stucco is forced in over the top of the window frame, and the molding *r* is nailed close up against the plaster to make a tight joint.

The plaster ceiling of the basement is shown on the under side of the joists.

The cellar window frame is of wood, as indicated by free-hand hatching. The head of the frame is shown at *s*, the staff bead or molding at *r*, the sash at *u*, and the inside trim, or architrave, at *t*.

9. The section *B-B* is taken through the jamb, or side of the frame, and, the window being a casement window, the construction of the jamb is essentially the same as that of the head. The wooden strip *y* may be placed in the form and the wall cast around it. Then the frame, when it is afterwards set in the wall, can be nailed to the strip and will be held securely in place. If, however, the frame is set in position before the wall is poured, the strip is nailed to the side of the frame and the concrete when cast against the frame encloses the strip. In either case the frame is held securely to the wall and the strip forms an air stop.

At *v* is shown an enlarged detail of the molding of the sash rail.

10. The section *C-C* is taken through the sill, and the finish of the wall beneath the sill is shown. The masonry sill is formed of concrete and is 6 inches above the area floor, as indicated by the dimension. The wood sill is made of 2-inch material, but in the process of making its actual thickness is reduced at least $\frac{1}{4}$ inch. The wood is set at a slope to shed water, and has a rabbet formed in it corresponding with a rabbet in the bottom of the sash, as is shown at a larger scale at *z*. The curved raised part of the sill at *z* is devised to prevent rain from being blown through the joint.

The concrete wall inside the window sill is splayed so as not to hold dust and not to intercept light.

A groove is ploughed in the bottom of the sill and the concrete will work up into this groove when it is poured, and thus form an air-stop.

Concrete and plaster are indicated similarly in elevation, but it should be easy to determine from the general construction which material would be used.

The broken slanting line extending from the head to the sill indicates the swing of the sash, and that it is hinged at the top.

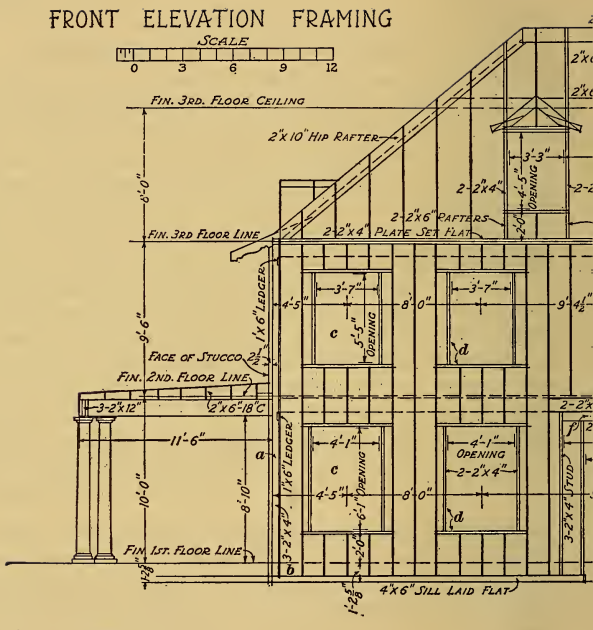
DOUBLE-HUNG WINDOW IN A WOODEN WALL

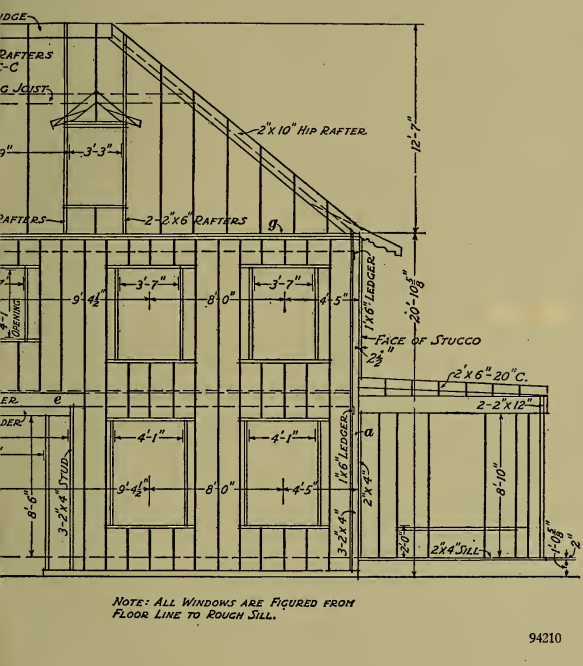
11. In Fig. 3 is shown a detail of a double-hung window in an ordinary frame building covered with plaster, or stucco. This drawing is shown in the figure at one-sixth its actual size, or at a scale of $2'' = 1'\,0''$. It will therefore not be convenient to measure for this drawing unless the rule used has inches subdivided into 12 parts. These measurements can however be taken with an architect's scale, by using the 1-inch scale, in which 1 inch equals 1 foot, and calling the dimensions one-half of what they read at that scale.

This drawing is similar to the detail of the cellar window, in that it shows parts of the exterior elevation of the window, and three sections. In addition to these features, however, it shows parts of the interior elevation. In the study of this detail, it will be found helpful to refer also to Fig. 4, which shows in perspective the sections and parts of the same window represented in Fig. 3, and, with one or two exceptions, has the parts lettered the same.

12. In the section through the head, the double $2'' \times 4''$ timbers across the top of the frame, which constitute a header, are shown by rectangles *d*, the fact that they are of wood being indicated by the diagonal lines. Vertical studs rest on this header, and the sheathing *e* is nailed to them. On the inside of the studs are the lathing and plastering *f*. On the inside of the header is a wooden strip *g*, called a *ground*, which serves to regulate the thickness of the plaster and furnishes a support to which the inside trim is nailed.

On the outside of the sheathing, at the top, is shown furring *h*, to which plastering or stucco is applied. The metal lath is indicated by the **S**-shaped lines in the plaster, which





NOTE: ALL WINDOWS ARE FIGURED FROM FLOOR LINE TO ROUGH SILL.

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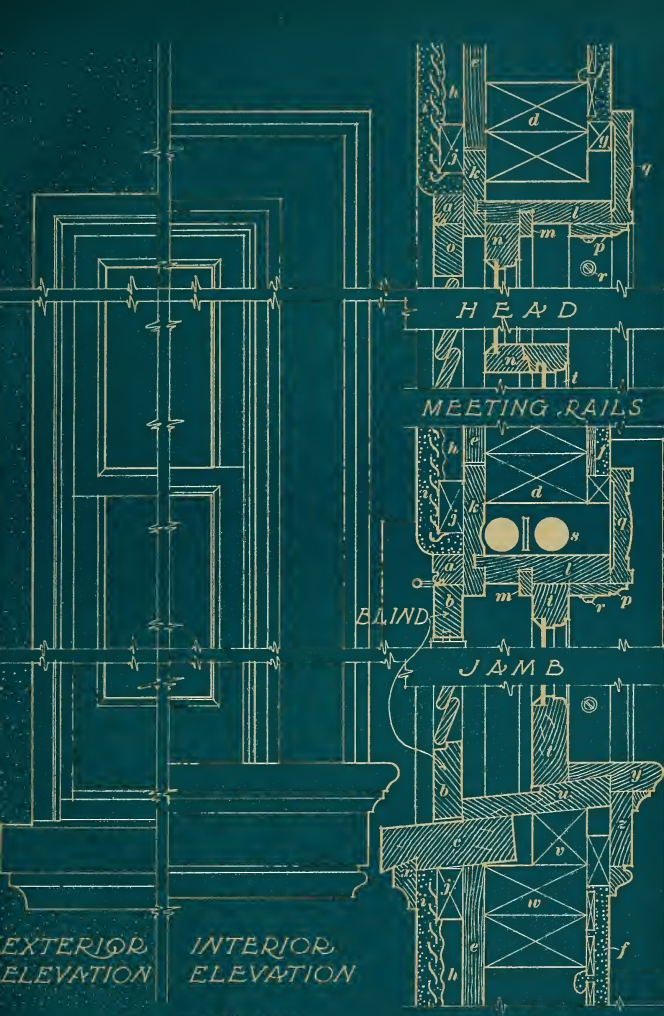

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FIG. 3

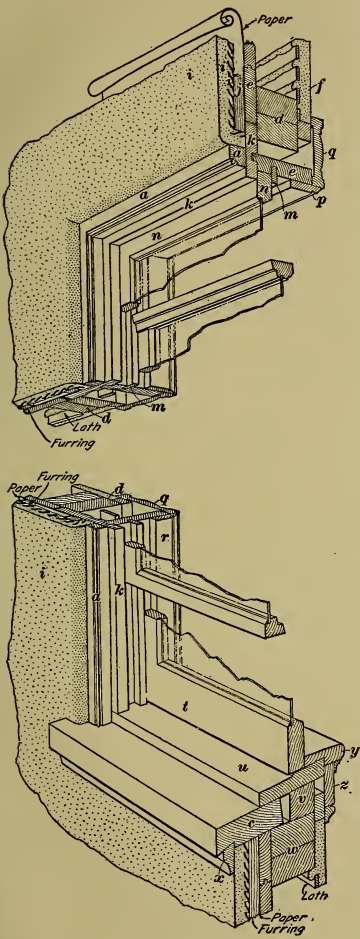


FIG. 4

is represented by dots. The plastering is carried around the blocking *j*, against the outside casing *k* of the window frame. The staff bead, or blind stile *a*, is nailed in the corner. At *l* is the head of the window frame. The piece *m* is the parting strip that keeps the sash apart at a fixed distance. At *n* is the upper sash, which slides down. At *o* is the upper rail of the blind; at *p*, the stop bead which keeps the inner sash in place. The inside trim, or architrave, is shown at *q*, and at *r* are seen adjusting screws which hold the stop bead to the head and sides of the frame, but at the same time permit the stop bead to be adjusted.

13. In the section through the meeting rails is shown the bottom of the outer sash, and the top of the inner sash, as they meet when the window is closed.

14. The section through the jamb is very similar to that through the head, except for the weight box, which is formed by keeping the double studs *d* back from the pulley stile *l*, so that sash weights *s* may be accommodated. These sash weights are indicated by the white circles. The small rectangle between the weights represents a *pendulum* strip which is hung from the top of the box, and is intended to keep the weights from striking each other as they move up and down inside the box. The weights are used to counterbalance the sash, and they move up and down as the sash are moved in the opposite direction.

15. The section through the sill has several features not shown in the other sections. The bottom rail *t* of the inner sash is shown resting on the sill *u*, which is set at a slant so as to shed water. The sill rests on the subsill *c*, which extends out in front of the plastered face of the wall, and has a mold *x* beneath it. The appearance of this sill in elevation is shown in the exterior elevation of the window.

Inside the window, the stool *y* rests on the sill, and beneath the stool is the apron *z*, with bed molds at its upper and lower edges. The appearance of this feature is shown on the interior elevation. It will be noted that the stool and apron are returned against the interior plaster. This is shown in the section through the jamb, where the letter *f* is placed. It is also shown on the interior elevation.

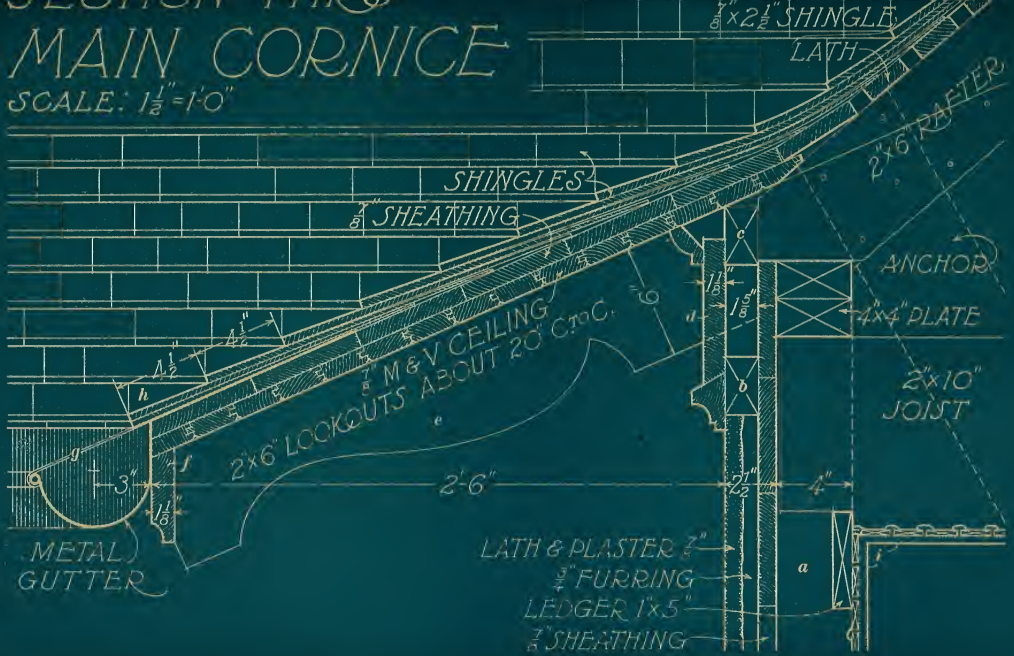
MAIN CORNICE

16. In Fig. 5 is a blueprint of a simple form of a projecting cornice, or eaves. This detail consists of a section through the cornice, and a partial elevation.

The wall, as shown at *a*, is of the same construction as that shown in Figs. 3 and 4, and consists of studs, sheathing, furring, outside stucco, and inside plastering. A 1″×5″ ledger board is shown supporting 2″×10″ attic joists. On top of these joists is the 4″×4″ plate, made up of two 2″×4″ pieces, and indicated by diagonal lines as timber. The sheath-

MAIN CORNICE

SCALE: $1\frac{1}{2}$" = 1'-0"



ing and the other wooden parts are hatched to indicate finishing lumber. The plaster is dotted, and the sheet metal of the gutter is marked by vertical lines. A $\frac{7}{8}$″ thick anchor which holds the rafters in position is shown by broken lines.

At *b* and *c* is shown blocking to which the fascia *d* and the two bed moldings are secured. The lookouts *e* are of the thickness and spacing described on the drawing, and for support are extended into the building and spiked to the rafters. The blocking *c* is cut in between these lookouts. The lookouts can also be spiked to the sheathing or plate if desired.

On top of the lookouts are nailed matched and V'd ceiling boards. The tongues and grooves show plainly in this detail, as do the slightly beveled edges which form the V's.

At *f* is a small fascia, nailed to the ends of the lookouts, and against this the gutter rests. This gutter is a plain half-round gutter formed of sheet metal. The lower part is curved, and the upper part extends up under the shingles as shown by the heavy white line. A metal strap *g* holds the outer edge of the gutter firmly in place and is nailed to the roof under the shingles. The shingles are shown with a double row at the bottom of the slope *h*.

At *i* is indicated the wood lathing and the plastering with which the interior walls and the ceiling are covered.

KITCHEN DRESSER

17. In Fig. 6 is given a detail of a kitchen dresser; this drawing consists of an elevation, a plan, a side elevation, and a section. There are also given a series of larger-scale sections through various parts of the dresser, to show its construction.

The elevation shows, in its lower part on the left, two large drawers and two small ones. At the right, a cupboard or pot closet with a single shelf is shown. Over this part is a shelf, called a counter shelf, extending back to the wall. This will be seen very clearly in the side elevation and in the sections. Above the counter shelf is a closet with shelves and glazed doors in front of them.

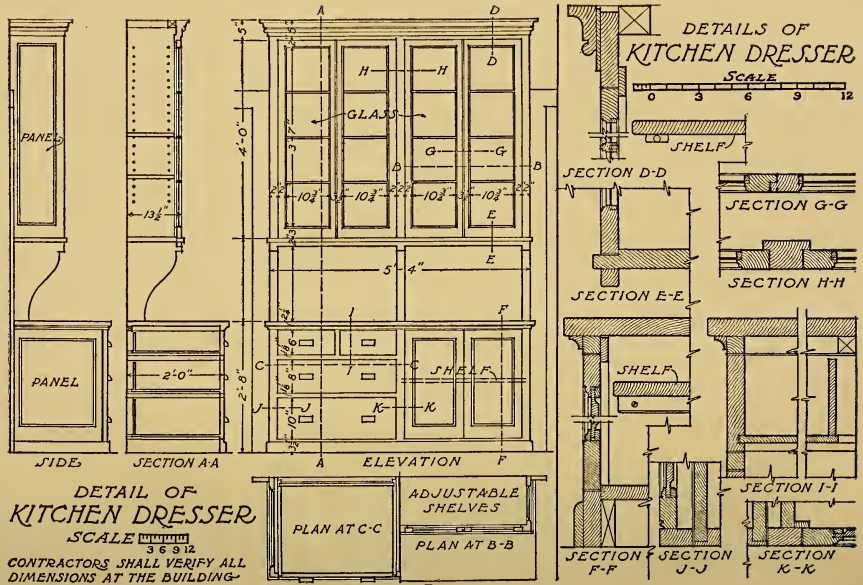

DETAILS OF
KITCHEN DRESSER
SCALE
0 3 6 9 12
SHELF
SECTION D-D
SECTION G-G
SECTION H-H
SECTION E-E
SHELF
SECTION I-I
SECTION F-F
SECTION J-J
SECTION K-K
PANEL
13½"
PANEL
2'-0"
SIDE
SECTION A-A
A
D
H
H
D
GLASS
G
G
B
B
10¾"
10¾"
10¾"
10¾"
E
E
5'-4"
4'-0"
5'-4"
F
F
I
I
C
C
SHELF
J
J
K
K
10"
2'-8"
A
ELEVATION
F
DETAIL OF
KITCHEN DRESSER
SCALE
3 6 9 12
CONTRACTORS SHALL VERIFY ALL
DIMENSIONS AT THE BUILDING
PLAN AT C-C
ADJUSTABLE
SHELVES
PLAN AT B-B

FIG. 6

The section *A-A* shows a slice through the dresser on the line *A-A* in the elevation.

18. The details at the scale of $1\frac{1}{2}=1'\,0''$, or one-eighth actual size, can be measured by using the rule and calling each eighth of an inch one inch. Each section is marked with letters corresponding to those on the elevation, which indicate where the section is taken. The indications are for dressed lumber, and the construction is that customarily used.

Careful study of these sections, and comparison of them with the various parts of the drawing, will give a good understanding of the methods commonly employed in representing such work so that a workman skilled in his trade will be able to construct the object shown.

PLANS OF A SCHOOL BUILDING

19. General Explanation.—A masonry building will now be considered. This building is a six-room schoolhouse having foundations of concrete, exterior walls of brick, and trimmings of stone and terra cotta. The roof is covered with slate, and the gutters, hips, ridges and cupola are covered with sheet metal, either copper or galvanized iron.

On the first floor are three class rooms, and on the second floor three more class rooms and a room for the principal. In the basement are two play rooms, two toilets, and space for the heating and ventilating apparatus. There are also the entrances, halls, corridors, and stairs that are necessary for access to the various rooms.

The class rooms are the principal features in this building, and they occupy the larger parts of the first and second floors.

20. The design of a school building presents special problems. A large number of pupils must be taken care of in the class and play rooms. These rooms should therefore be provided with sufficient heat and fresh air. There should be sufficient light coming in over the left shoulders of the pupils as they sit at their desks. Entrances and exits should be

planned for convenience. The safety of the scholars should be assured by providing large, wide corridors and ample exits. The doors should all open outward so that the exits cannot be blocked by the doors being closed.

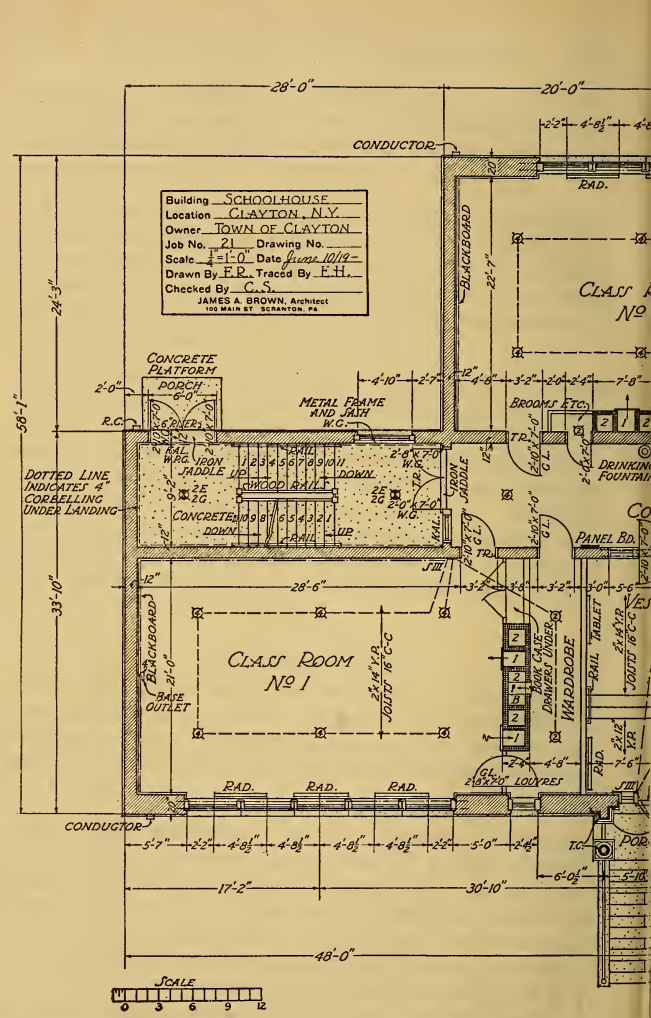
21. Every school building should be built so as to comply with state and local laws, which vary in different localities. In the preparation of the plans shown herewith, all these matters have been considered, and the plans would be acceptable to most authorities, and satisfactory for the erection of a good schoolhouse.

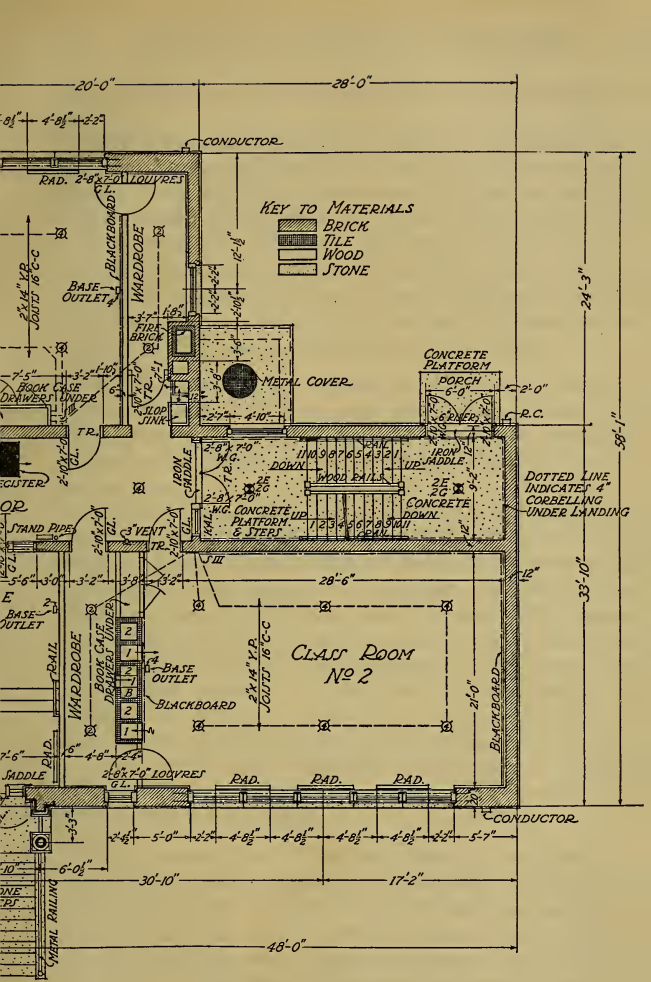
22. Drawings.—The drawings shown are the Basement Plan, the First-Floor and the Second-Floor Plans; the Front, and the Side Elevations, also a number of details, as Figs. 12 and 13. A set of drawings such as this is sufficient for a contractor to estimate from. Additional details, both scale and full size, would be made as the work progressed. The details here given show features that are peculiar to school buildings of the character shown. In many respects the drawings are like those described in *Reading Architects' Blueprints,* Part 2.

FIRST-FLOOR PLAN

23. The First-Floor Plan will now be considered. In studying parts of any drawing, the other drawings that show these parts, either in elevation, section, or plan, should be consulted so that all information given regarding these parts may be obtained.

24. Main Entrance.—The main approach to the building is up a flight of eleven steps, leading to a large platform. These steps and the platform are dotted and marked *Stone Steps.* The steps have stone cheeks which can be seen in the Side Elevation. These cheeks support metal newels and hand rails. The cheek walls are themselves supported on foundation walls which extend into the ground 3 or 4 feet so as to be below the influence of frost. These foundation walls are shown in the Basement Plan. Between the foundation of the





FIRST - FLOOR - PLAN

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cheeks are two walls that support the steps in between the cheeks.

In the First-Floor Plan, on the platform, are indications of columns. These are marked *T. C.*, which signifies terra cotta. These columns rest upon square bases. Against the wall back of the columns are pilasters and quoins. This work is indicated by thick lines which are approximately the thickness of the terra cotta. The sections here are too small to contain the proper indications for terra cotta as shown in *Reading Architects' Blueprints,* Part 1, but the fact that these features are marked *T. C.* leaves no doubt as to their nature.

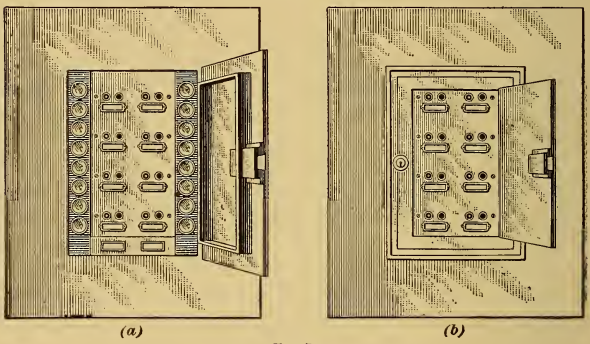
25. The doors at the entrance are double and swing outwards. Beneath them is a stone sill, forming a step from the platform to the vestibule floor. This sill is shown dotted. A brass saddle covers the joint between the stone sill and the wooden floor.

On either side of the doors, sidelights are indicated in the plan. The Front Elevation shows them to contain single sheets, or lights, of glass which are about of the same height as the glass in the doors. The indication *TR.*, on the plan, shows that there is a transom over this door. This appears in the Front Elevation. Over the platform is an ornamental canopy which is formed of terra cotta and is supported on the columns and pilasters. A side view of this canopy, the columns, and pilasters, is given in the Side Elevation. A lantern of wrought iron supported upon wrought-iron brackets is shown on the Front Elevation. This lantern is equipped with electric lights, and the indication on the First-Floor Plan shows outlets for four lights.

26. Vestibule.—The vestibule shown on the First-Floor Plan is divided into two parts by a short flight of stairs, three risers being shown. These stairs have hand rails against the walls on each side. On the wall on the left side is shown a notation indicating that a tablet of iron or bronze will be placed there. This tablet may contain the name of the school, the names of the building committee, the architect, and the contractor, as well as the date when the building was erected.

Just inside the door is an indication of three switches. One of these controls the light in the lantern over the porch, another controls two lights in the vestibule, and the third controls one light in the corridor. Thus a person entering at night may turn on the lights in the corridor which will enable him to see the panel board, where he can turn on additional lights as required.

A notation on the floor of the vestibule gives the information that 2″×14″ yellow pine joists 16 inches on centers are used in the larger portion of the vestibule, and 2″×12″ joists



(a) (b)

FIG. 7

in the smaller portion. This implies that the flooring will be of wood in both portions.

From the vestibule, a pair of doors leads to the corridor. These doors have a side light on each side, and are indicated as double-swinging and glazed. A transom is indicated that will probably extend over both the doors and the side lights. These doors, as well as the front doors, would be constructed from scale and full-size details. The partitions on each side of the vestibule are indicated as stud partitions plastered on both sides.

Other indications in the vestibule are two ceiling outlets for four lamps each, one base outlet for two lights, and two radiators.

27. Corridor.—The corridor connects the vestibule with the stair halls. It also contains the entrance doors to the three class rooms and the wardrobes. All the doors to these rooms open outwards into the corridor so as not to interfere with the pupils coming out in case of fire or panic. The indications at these doors are *GL.* for glass panels, and *TR.* for transoms.

28. A panel board is indicated in the corridor. This board holds all the switches that control the lights in the first-story rooms. In Fig. 7 is an illustration of a panel board of the safety type that would be used in this position. The switches are operated by push buttons. There are practically two doors, both of which are shown open in (*a*), where the fuses and the push buttons are visible. In (*b*) the door that covers the fuses is closed, leaving only the push buttons exposed. Both doors may be locked to prevent tampering with the switches.

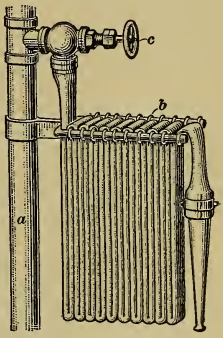


FIG. 8

29. A standpipe is indicated in the corridor and consists of a vertical water pipe, as *a*, Fig. 8, to which is attached a hose *b* with a nozzle. The standpipe connects with the public water supply or with a tank of water on the roof. In case of a fire the hose is pulled off the rack and the valve *c* is turned. The water is then forced through the hose.

30. Opposite the entrance to the corridor is a double circle which indicates a drinking fountain. This fixture is specified and the style and make mentioned in the specifications. A drinking fountain is illustrated in Fig. 9. This fountain is of the bubbling type. At *a* is the pipe through which water is supplied. This pipe runs up through the waste pipe *b*, and the water bubbles out through the opening at *c*. The

bowl *d* which catches the water as it falls is made of porcelain. The bowl *e* is made of enameled iron, as is also the standard *f*. Valves to regulate the flow of the water are shown at *g* and *h*. Fountains of this type provide a sanitary method of supplying drinking water to the pupils.

31. A large floor register is indicated in the corridor. Such a register, on which pupils can stand, is especially valuable in a school building, as pupils often arrive at school chilled or with wet clothing or feet, and the register furnishes means

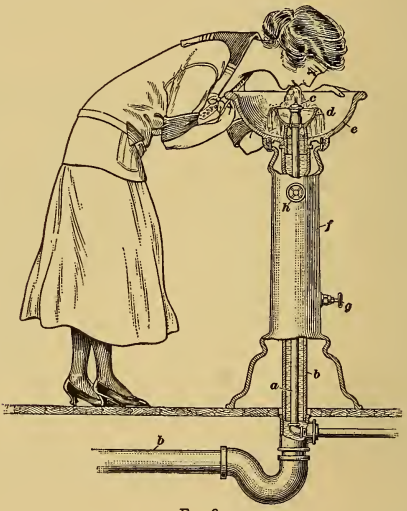


FIG. 9

for quickly drying and warming them so as to avoid danger of sickness.

32. Fireproof Stairways.—At each end of the corridor are fireproof stair halls. The walls between the stair halls and the rooms, as well as the outside walls, are of brick and are 12 inches thick. A pair of doors open from the corridor

to each stair hall. These doors together with the side lights and transoms are indicated as kalamine, or metal-covered, with polished wire-glass panels. These doors open outwards from the corridor into the stair halls. Beneath these doors are placed iron saddles, under which the wooden floors of the corridors and the cement floors of the stair halls meet. The stairs are of cement, or concrete, as is also the floor of the stair hall. In order to prevent slipping, the stairs have special treads and nosings. One type of such, shown in Fig. 10, consists of a casting having grooves of the form shown, some of which are filled with a patented non-slipping preparation. The landings at the ends of the flights leading to the basement are of concrete construction. These landings are below the level of the first floor, and just one step above the grade level. A pupil entering the building will have to ascend one-half of a story to reach the first floor, and descend one-half a story to reach the basement. Hand rails are shown on each side of the stairs, the small squares at the tops of the runs or flights indicating newels.

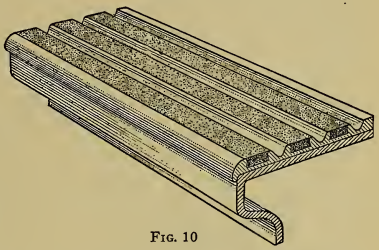


Fig. 10

33. The stair halls are lighted by windows on each floor, and by the glass panels in the doors that lead to the playgrounds. There are also combination lighting outlets indicated, for two electric lamps and two gas jets, so that when the building is occupied at night there will always be light in the halls.

The risers are indicated by numbers starting with number 1 at the bottom in each run.

34. Yard Entrances.—Entrances to the stair halls are shown on either side of the building. The plan shows a slab of concrete at the ground level and a stone sill one step above

this slab. Double doors opening out are shown at these entrances. As these doors are in a fireproof stair hall they are indicated as kalamine doors, with wire-glass panels. Over each of these doors is a canopy, one of which is seen in the Side Elevation; this canopy consists of a sheet-metal roof with a metal cornice and gutter all around, and is supported at its outer edge by chains that are bolted to the wall, and the end of the canopy against the wall is supported on the wall. The plan of the canopies can be seen in the Second-Floor Plan, the diagonal line indicating a slight depression forming a gutter in the roof.

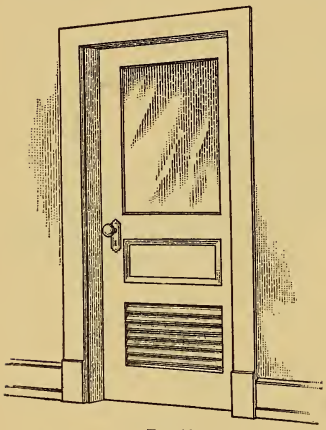


FIG. 11

The yard entrances are shown on the First-Floor Plan, notwithstanding they are a half-story below the first-floor level. They will therefore not be shown on the Basement Plan.

35. Class Room No. 1.—The three class rooms opening off the first-floor corridor are numbered 1, 2, and 3 for identification. These rooms are practically the same in size, and each will accommodate about 42 scholars. Each has, in connection with it, a wardrobe where the scholars may hang their hats and coats, and also deposit umbrellas, rubbers, etc. Class room No. 1 is entered from the corridor by a single door opening out. This door is marked *2′ 10″×7′ 0″ GL. TR.*, meaning that the door is 2 feet 10 inches wide and 7 feet high, with a glass panel, and that there is a transom over the door.

36. Another entrance to the class room is through the wardrobe. The door to this wardrobe is the same in size and construction as the class-room door, but does not have a tran-

som. A door from the wardrobe to the class room is also seen near the outside wall. This door is double-acting, as the pupils will use it when entering and leaving the class room. The lower panel of this door, instead of being made solid, is composed of louvres, or slats, or else a coarse wire mesh, so that air can be drawn into the wardrobe and out at the ventilating flue. The upper panel may be of glass. Such a door is shown in Fig. 11.

37. Just inside the class-room door is a bookcase, fitted with shelves and drawers. The doors of the bookcase are glazed, and are fitted with locks. This bookcase would be constructed from details.

38. Blackboards are indicated on the sides of the room, the indication being a dash-and-dot line. The construction of the blackboard is shown in the detail sheet, Fig. 12, which will be studied later.

39. The windows of this class room consist of five double-hung windows in one large group. This arrangement provides an abundance of light, and reduces the tendency to shadows. Mullions are shown between the windows. These mullions must contain the weights for the sash, and also **I** beams as shown which support the lintels over the windows. These lintels are shown by heavy dot-and-dash lines and are composed of two 6-inch channels and one 4″×4″ angle. This lintel is also shown in section in the typical section at the side of the Front Elevation as well as in the detail sheet, Fig. 13, which will be described later.

40. Heating and ventilation is provided by means of the stacks or ducts between the class rooms and the wardrobes. The indications for heating and ventilation given in *Reading Architects' Blueprints*, Part 1, are used here. The flues marked *B*, *1*, and *2* show the supply and exhaust ducts. The arrows indicate the direction of the air-currents to and from these ducts. The arrows having straight shafts are used for the supply ducts and those having wavy shafts for the exhaust ducts. The registers at the openings to supply ducts are indi-

cated by heavy solid lines, and the registers to the exhaust ducts by double light lines. The ducts which have no openings on the floor are marked with the number of the floor into which they open. The walls of these ducts are indicated as tile, and are 4 inches in thickness. In the middle of the group of ducts next to class room No. 1, are three ducts separated by thin lines. These lines represent sheet metal.

Radiators are shown under the windows, to be used in cold weather to supplement the heat furnished by the air ducts.

41. The class room is lighted artificially by the electric lights shown in the ceiling. Just inside the entrance door of class room No. 1, at the left, is an indication of three switches, with broken lines leading to the various outlets. One switch controls one ceiling outlet, another controls the remaining five in the class room, and one controls the two outlets in the wardrobe. The ceiling outlets in the class room are all indicated as 4-light, meaning that the wires are large enough to feed four lights of 50 watts capacity each. The baseboard outlet is for four similar lights, and each of the wardrobe outlets is for two lights. The baseboard outlet may be used for a light on the teacher's desk, or for the operation of whatever electrical equipment may be desired, such as a vacuum cleaner, magic lantern, etc.

42. Floor Construction.—An indication on the floor of the class room shows that the floor joists are 2″×14″, spaced 16 inches on centers, and that they are yellow pine. The arrows show the direction in which the joists run. The flooring will obviously be of wood, since the joists are wood, and will be carefully described in the specifications.

43. Ceiling Construction.—The ceilings, instead of being plastered, are covered solidly with $\frac{7}{8}$-inch boarding that is tongued and grooved. A metal ceiling is attached to this boarding and forms a fire-resisting ceiling. This construction is indicated in the section on the Front Elevation, also in Fig. 13.

44. Wardrobes.—The wardrobes may be entered directly from the corridor without passing through the class rooms.

Along the walls of the wardrobes are hat and coat racks, a detail of which is shown in Fig. 12. Air for ventilating the wardrobes enters from the class rooms through the louvres in the doors and is drawn out through ducts indicated by the arrows having wavy shafts. A window lights each wardrobe.

45. Class Room No. 2.—Class room No. 2 is similar to class room No 1, except that the wardrobe and entrance are at the opposite end of the room. In general the same indications appear as in class room No. 1.

46. Class Room No. 3.—Class room No. 3 does not differ materially from the class rooms just described, except that there are two entrance doors, and the heating and vent flues are on the side instead of on the end, and the bookcase is on the side of the room. The arrangement of the lighting outlets is similar. The chimney extends out into the wardrobe for a short distance and is lined with firebrick. Beside the chimney is a ventilating flue from the basement. This flue has terra-cotta walls, and is arranged to exhaust the air from each of the floors.

47. Slop Sink.—Beside the entrance to the wardrobe used in connection with class room No. 3, a slop sink is indicated. This fixture is for use in drawing and emptying the water used in cleaning the first floor.

48. Broom Closet.—A small closet is built off the corridor for the purpose of holding the brooms, mops, and other equipment used by the janitor or others employed about the building. This closet has shelves for the storage of supplies, and a lighting outlet, as much of the cleaning will be done at night.

49. Walls.—The walls on the outside of the building are brick, the front walls being 20 inches, or five bricks, thick, and 12 inches beneath the windows, as shown in Fig. 13. The side walls on the plan are 12 inches, or three bricks, thick. The walls in the rear of class room No. 3 are of the same thickness as the front walls. The walls between the class rooms and the stair halls and the corridor are 12 inches thick.

The class-room walls that are against the outside of the building are furred and plastered, as a precaution against dampness.

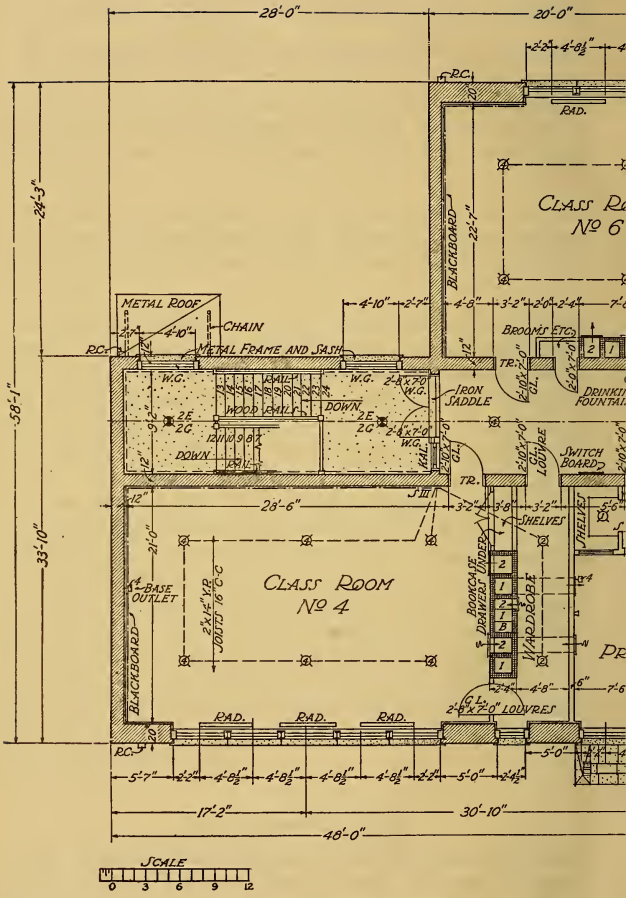
50. Ash-Pit.—Outside the building, near the chimney, is shown a concrete slab over the ash-pit which is seen on the basement plan. This slab has a cast-iron cover, the top being checkered to prevent slipping, and having handles so that it can be removed for the purpose of taking out the accumulated ashes.

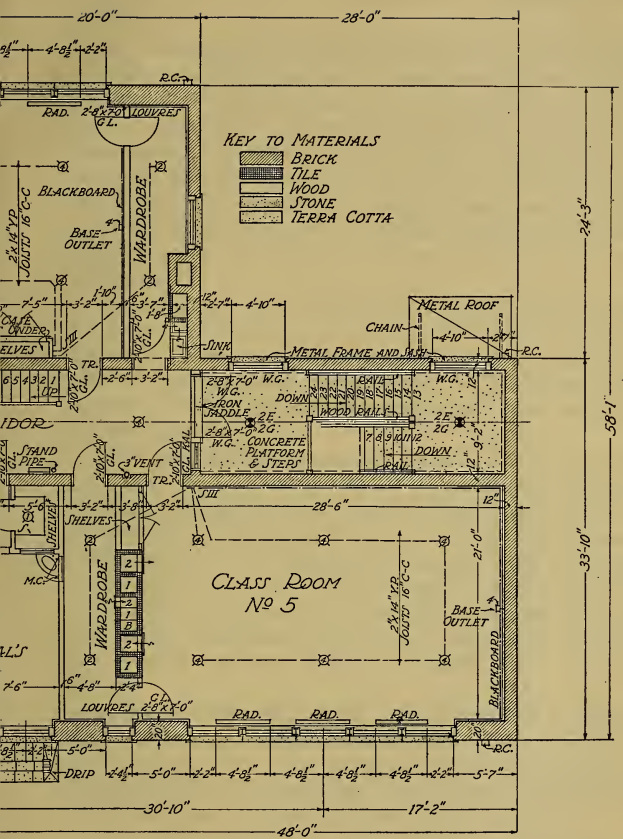
51. Rain Conductors.—On the corners of the building are shown the conductors which dispose of the water that falls on the roof. These conductors are shown also in the elevations.

52. Dimensions.—The First-Floor Plan is fully dimensioned. It must be remembered that in actual construction the contractor lays out the building from the Basement Plan, and by the time the building is erected up to the first-floor level, the over-all dimensions of the building are established. The over-all dimensions of the first floor will thus be determined. The dimensions given on the First-Floor Plan, however, are important in locating the openings, partitions, etc., on the building, as well as for estimating purposes. A comparison of the First-Floor Plan, with the Basement and the Second-Floor Plans, will show the relation of the dimensions. It will be excellent practice to check up the measurements shown on the First-Floor Plan, by adding up the partial dimensions, and comparing the results with the total dimensions. It will also be good practice to compare the figures on one plan with those in the other plans, and find out if the windows, for instance, are so figured as to come exactly over each other in all the plans.

SECOND-FLOOR PLAN

53. General Explanation.—The Second-Floor Plan is similar to the First-Floor Plan, in most respects. It shows three class rooms, located directly over the ones in the First-Floor Plan, and these rooms have the same indications as





SECOND - FLOOR - PLAN

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those below. In place of the vestibule, a principal's room is shown.

54. Principal's Room.—The principal's room is entered from the corridor by the double doors opening out. A short passage is indicated leading to the main part of the room, and on either side of the passage are supply closets, for the miscellaneous supplies for the class rooms. The supply rooms are fitted with shelves, and are lighted by fixed sash through which light comes from the principal's room, and artificially by ceiling lights controlled by switches operated by the doors. When the doors are opened, the lights are turned on automatically.

The principal's room is lighted by a triple mullion window, the general arrangement of which may be seen on the Front Elevation. In one corner of the room is shown a wash basin, with a medicine closet placed above it. The room is also lighted by a 4-light outlet in the ceiling, and a base-board outlet for four lights.

Fresh warmed air is supplied by the duct that supplies class room No. 1 on the first floor. The amount of air needed for the principal's room is small, and the duct is ample for all ordinary requirements. For very cold days, and for unusual conditions, such as a possible break-down of the fan system, or the use of the room at night, a radiator is provided under the window. The foul air is exhausted through the same duct as that from class room No. 4, as indicated by the dotted lines passing over the wardrobe connected with class room No. 4.

On the left-hand wall of the room is indicated a telephone outlet. From this outlet, the line may be extended to reach the principal's desk. The indication on this plan insures its being supplied by the contractor, who will consult the architect or the principal regarding the exact location desired.

55. Broom Closet.—A broom closet is indicated off the corridor, and a slop-sink at the entrance to the wardrobe of class room No. 6. These indications are similar to the corresponding indications in the First-Floor Plan.

56. Roofs at Entrances.—On the Second-Floor Plan are seen the roofs over the yard entrances. They are shown pitching in the directions of the conductors, and the chains which support them are shown at each side of the roof. The roof of the front entrance is also shown, and is dotted to indicate that it is terra cotta.

57. Stair Halls.—The stair halls differ from the halls in the First-Floor Plan in that the stairs are shown in one direction only, as there is no stair to the attic or third floor in these halls. In the place of the stair going up, there is a rail across the end of the well hole. The doors from the stair halls to the corridor have side lights for giving additional light in the corridor.

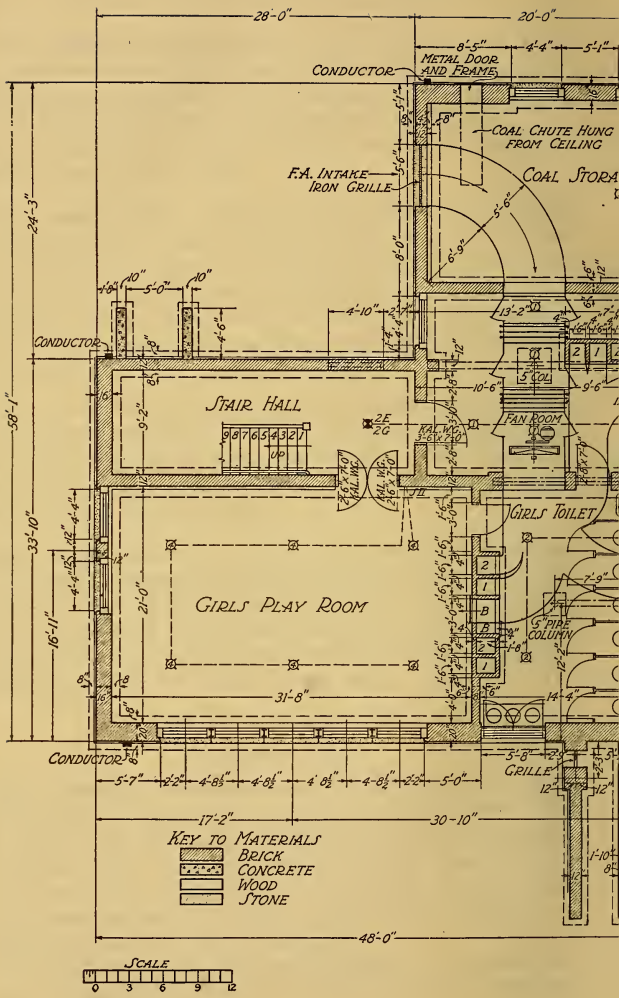
58. Corridor.—The corridor shows double doors opening out from the principal's room. It also shows a stair from the second floor to the attic. As the attic is used only for storage, the stairs need not be so wide as ordinary stairs where there is frequent travel.

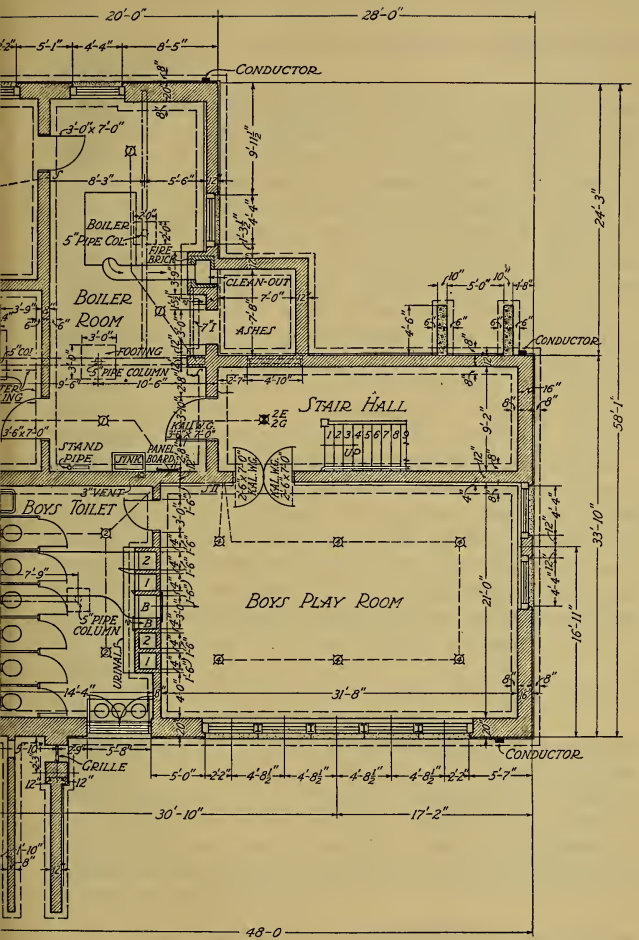
59. Dimensions.—As most of the walls and partitions are carried up straight from the basement and the first floor, there are few dimensions needed, and these are similar to those on the First-Floor Plan. The outside dimensions for windows and walls are all given, as well as certain inside dimensions that will fix the location of the various parts.

BASEMENT PLAN

60. General Explanation.—The basement is reached by means of the stair halls in each end of the building. The stair hall at the right opens into the boys' play room and into the boiler room. The stair hall at the left opens into the girls' play room and into the fan room. From the play rooms, doors open into the toilet rooms, and from the boiler room a door gives access to the coal storage.

This plan shows not only the arrangement of the basement rooms, walls, windows, and other parts, but it also shows, by





BASEMENT - FLOOR - PLAN

broken lines, the footings and foundations under the walls and other parts.

61. Walls and Footings.—As this plan will be used for laying out the building, it is dimensioned fully. The thicknesses of the walls are given in several places, and the sections indicate that brick is the material used. By referring however to the sections shown with the elevations, it will be noted that the brick in the outside walls begins at the bottom of the water-table, concrete being used below the water-table. The walls, however, are of the same thickness for both materials. The inside walls, or partitions, are brick down to the footings, which are about 4 inches below the finished floor line. The walls are calculated for using a standard brick which is about $3\frac{3}{4}$ inches wide, the brick being laid with a $\frac{1}{4}$-inch mortar joint. The wall thicknesses are therefore given as multiples of 4 inches, such as 8-, 12-, 16-, and 20-inch. Should a larger brick be used, these dimensions would be increased.

The walls that support the front-entrance steps are shown to be 12-inch for the walls carrying the cheeks, and 8-inch for the walls which carry the middle portions of the steps. Piers 2 feet by 2 feet are shown for the support of the columns that carry the front porch. There are openings in these walls for access to the space beneath the steps, and these openings are covered by iron grilles that permit a circulation of air for ventilation.

Foundation walls for the play ground entrances are shown to be 10 inches thick, and made of concrete.

Footings for all the walls are shown by broken lines inside and outside of the walls. Footings are also shown under the stacks that contain the heating and ventilating flues from the fan to the various rooms, as well as under the pipe columns. The width of the footings outside the walls they support are indicated at several places, while the sizes of the footings under the columns are also given.

62. Stair Halls.—The First-Floor Plan shows two fireproof stair halls leading down to the basement. On the Basement-Floor Plan may be seen the lower ends of these stairs,

broken off to show that the remainder of the stair is shown on another drawing. The risers are numbered, and arrows indicate the direction in which the travel leads to the floor above. These stair halls are contained between the same walls as on the first and second floors, and consequently are practically the same size.

From the stair hall at the right a single kalamine, or metal-covered, 3′ 6″×7′ 0″ door with a wire-glass panel leads to the boiler room. A pair of double-acting doors, each 2′ 6″×7′ 0″ with wire-glass panels, lead to the boys' play room.

From the stair hall at the left, a single 3′ 6″×7′ 0″ door leads to the fan room. This door also has a wire-glass panel, as indicated by the letters *W. G.* A pair of double-acting doors open from this hall to the girls' play room. These doors also have wire-glass panels.

Both of these halls are lighted by casement windows, which are placed high in the wall so as to be above the ground level, as the basement floor is below the ground level. Ceiling outlets, each provided for two electric and two gas lights are shown in the halls.

63. Play Rooms.—There are two play rooms shown in the Basement Floor Plan. The one on the right is for the boys and the one on the left is for the girls. These rooms are directly below the class rooms No. 1 and No. 2. Double-hung windows are shown in the fronts of these rooms, similar in width to the windows over them in the first and second floors. The construction of these windows is seen in the section at the left of the Side Elevation. Windows are shown in the end walls, the width of the brick opening being shown on the plans. A brick mullion 2 feet wide separates the pairs of windows.

Each play room is lighted by six electric ceiling outlets, with four lights in each. These are on two circuits, as indicated by the broken lines connecting the outlets with the switches just inside the doors.

Each play room may be heated by hot-air registers in the duct stacks as indicated. These registers will be closed when

the play rooms are not in use, and so will not take the heat from the class rooms during the hours that the class rooms are occupied. Each play room has a register to the same vent flue that takes care of the adjoining toilet room.

64. Toilet Rooms.—The girls' toilet room, which is entered from the girls' play room, has indications of six high-tank water closets, a slop sink, and three lavatories. The water closet stalls are enclosed with slate partitions and with doors opening out. A casement window opening in is located over the lavatories, and the room is lighted by two ceiling outlets. These lights are controlled from the switchboard in the boiler room, as indicated by the light lines leading to the board.

In the boys' toilet room, entered from the boys' play room, are a slop sink, three lavatories, six high-tank water closets, and a set of urinals. The type or style of these fixtures would be described in the specifications.

Each toilet room is heated from a register in the duct supplying the stacks leading to the class rooms. The toilet rooms are ventilated by registers to the stacks indicated by the wavy arrows.

65. Boiler Room.—In the boiler room, a boiler is indicated by a rectangle the approximate size of the boiler required, with the word *Boiler* on it. One end of the boiler is connected with the chimney by a curved smoke pipe, the arrows indicating the direction in which the smoke travels. At the side of the boiler is a circle representing a 5-inch pipe column on a footing 2′ 0″×2′ 0″. This column carries a steel girder, indicated by dot-and-dash lines. This girder is directly under a partition in the first and second floors. Under the wall of the corridor is an indication of a 5-inch pipe column on a 3′ 0″×3′ 0″ footing. This column helps to carry a steel girder on which the partition walls in the first and second floors are carried. In the boiler room is seen an indication of a standpipe and hose rack. There is also an indication of a sink and a switchboard or panel board which controls the lights on this floor. The circuits are indicated by broken lines.

Near the boiler is the chimney, which is lined with firebrick. An ash-pit is located just outside the building, in which cans of ashes can be stored until the ashes are carted away. A clean-out door is shown in the base of the chimney.

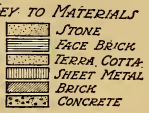
Doors are shown connecting the boiler room with the stair hall, the coal storage, and the fan room.

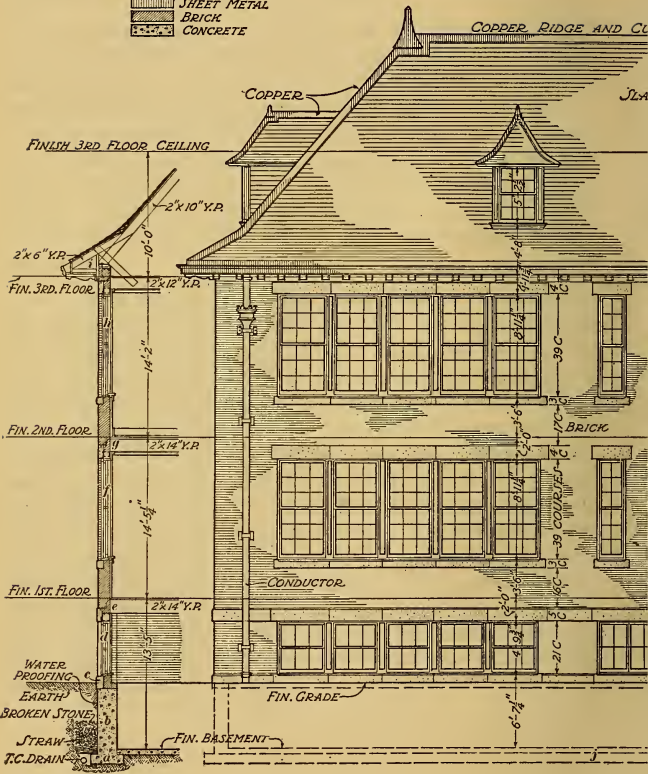
66. Coal Storage.—The space for coal storage is entered by a door from the boiler room. Coal is placed in the coal storage through a coal chute as indicated. The room is lighted by double-hung windows, and by a drop light near the door.

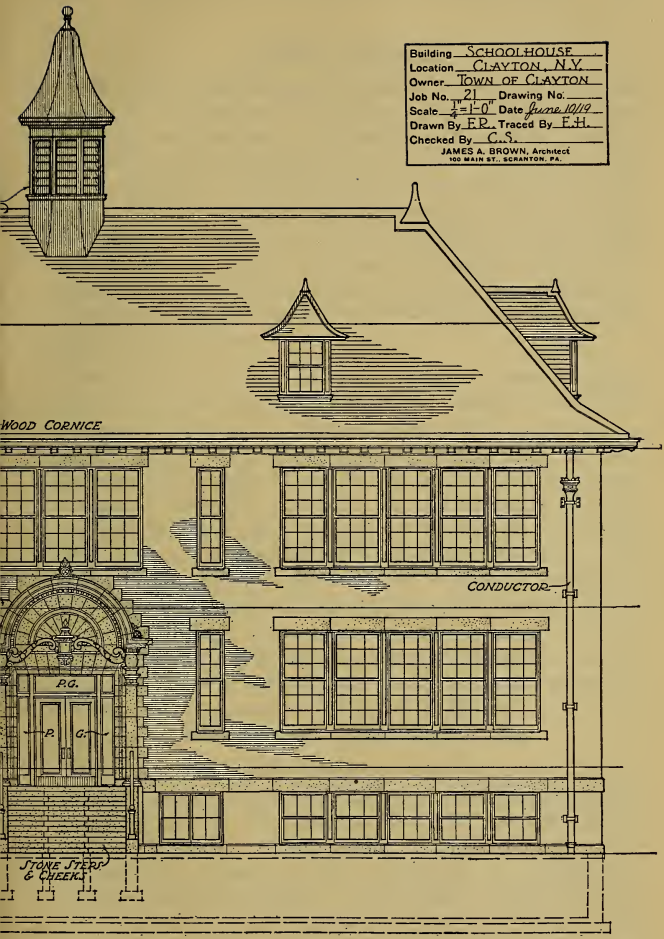
In the side wall of the coal storage is shown an indication of an opening covered by an iron grille. This is for the purpose of supplying fresh air to the heating apparatus through a duct. The duct is close to the ceiling and is curved as shown by thin solid lines. The arrows show the direction of the air-current.

67. Fan Room.—The fan room contains the apparatus for heating the air for the building, and a fan for forcing the air through the ducts. The fan also draws the air into the fan room through the fresh-air intake. An electric motor is shown which operates the fan. These indications are sufficient to show the contractor where the apparatus will be located, and the general nature of the apparatus required. Plans for the heating and ventilating plant will be prepared separately, either by the contractor doing that work, or by an engineer especially trained in heating and ventilating work. The work of installing the heating and ventilating apparatus is also done by a contractor making a specialty of this work. This contractor generally prepares his own plans. The architect must, however, understand these plans sufficiently well to provide space for the necessary ducts and flues, also for holes in the walls through which the ducts pass.

FRONT - ELEVATION






Building SCHOOLHOUSE
Location CLAYTON, N.Y.
Owner TOWN OF CLAYTON
Job No. 21 Drawing No.
Scale 1/4"=1'-0" Date June 10/19
Drawn By F.P. Traced By F.H.
Checked By C.S.
JAMES A. BROWN, Architect
100 MAIN ST., SCRANTON, PA.
WOOD CORNICE
CONDUCTOR
P.G.
P.G.
STONE STEPS & CHEEKS

94210

FRONT ELEVATION

68. The Front Elevation shows the various features that appear in the front of the building, such as doors, windows, the porch and the roof. It shows that the wall is composed of brick and the trimmings of cut stone, and that the ornamental canopy, or hood, forming the front porch is of terra cotta. The roof is indicated as slate with the hips and ridges of copper. A cupola for the bell is indicated to be covered with copper. A cornice is shown with brackets, and dormer windows with slate roofs and copper hips, ridges, and finials.

Below the finished grade, the walls and footings are indicated in broken lines.

69. At the left side of the elevation is drawn a section through the front wall which shows the relation between the elevation and the story heights. This section is taken at a point where it will give the most information about the construction of the wall. Thus, at *a* is shown a section through the concrete footings of the wall. At *b* is the concrete foundation wall, at *c* is a section through the window sill of the basement window. These sills form part of the water-table. At *d* is a section through the basement window, and at *e* the window lintel and the method of supporting the floor joists are shown. A section through the first-floor window is shown at *f*, the lintel and floor construction at *g*, a section through the second-floor windows at *h*, and a section through the main cornice at *i*.

This section represents a cut taken through any of the class-room windows shown in the Front Elevation.

70. A line of figures extending vertically through the windows of all floors shows the relation of the floor levels to the window openings. These figures should be calculated so that the tops and bottoms of the window openings and the top and bottom joints of the stone sills and lintels will coincide with the joints of the brickwork. So that there shall be no error in this matter, a line of dimensions in terms of brick courses is sometimes given, as shown at the right-hand side of the window group. In this line the basement window is marked

21 c, or 21 courses in height. Each brick course is considered as $2\frac{3}{4}$ inches, consequently the basement window opening must be $21 \times 2\frac{3}{4}$ in. $= 57\frac{3}{4}$ inches $= 4$ feet $9\frac{3}{4}$ inches. The distance between the window openings of the basement and first-floor windows is $5c + 16c + 3c = 24c$. $24 \times 2\frac{3}{4}$ in. $= 5$ feet 6 inches. The lintel of the basement window is marked *5 c* and is $5 \times 2\frac{3}{4}$ in. $= 13\frac{3}{4}$ inches in height. The sill of the first-story windows is *3 c*, or $3 \times 2\frac{3}{4}$ in. $= 8\frac{1}{4}$ inches high. The first-floor window is *39 c*, or $39 \times 2\frac{3}{4}$ in. $= 8$ feet $11\frac{1}{4}$ inches in height.

71. This will show the method used in obtaining the various dimensions given in the line through the windows. By using these figures the brickwork will lay up in uniform courses, and the sills and lintels will work in perfectly with these courses.

72. In detailing the terra-cotta work around the entrance porch, the same method must be used. The blocks of terra cotta should be made so that they will fit in with the brickwork. The details of the columns and cornice of the porch should be designed with reference to the brick courses. On this small drawing this has not been done but on a larger-scale detail it can readily be accomplished.

73. Main Entrance.—In the middle of the front is seen the main entrance, reached by the flight of stone steps, as already mentioned in connection with the discussion of the First-Floor Plan. The newels are here seen in elevation, and a very good idea can be obtained of the appearance of the door and of the terra-cotta porch columns and trim around the opening. The design of the lantern and the ornamental metal scrolls that support it are clearly indicated. Plate glass is used in the entrance doors as well as in the side lights and transoms. This is indicated by the letters *P. G.* This entrance would be executed from scale drawings and full-size drawings. An example of a working drawing for the terra-cotta work is given in *Reading Architects' Blueprints*, Part 1.

74. Walls and Openings.—The walls of the building are indicated as being constructed of brick with stone trim-

mings. As has been pointed out, these brick are to be laid 2¾ inches from center to center of joint. This size should be decided upon before starting to draw the elevation, so that the stonework and the brickwork will work in together. The kind of brick is generally selected from samples of different kinds and is specified to be like the chosen sample. The bond to be used in laying the brick should also be carefully specified, and if it is an unusual or fancy bond, should be shown on a detail.

75. The windows in school buildings are generally placed in groups, and the various state laws require that they shall be in area equal to a certain percentage of the floor area. The heads should be as close to the ceiling as possible. In this case the windows, except two in the basement, are all double-hung, and in the class rooms are arranged with mullions between them. The windows have stone lintels and sills, which are shown on both the elevations and in the sections. It will be noticed that the basement windows in the toilet rooms have casement windows opening in, and each sash contains four lights. The remaining windows in the basement are known as six-light, three lights being placed in each sash.

In the first story the windows are of two sizes. The windows in the wardrobes are narrow twelve-light windows, and the windows in the class rooms are wider, but of the same height, and have eighteen lights. The class-room windows are arranged in sets of five, with mullions between as already mentioned.

In the second story, the windows are the same as in the first story, with the addition of a triple mullion window in the principal's room. These windows are of the same size as those in the class rooms.

In the roof there are seen two dormer windows, in the fronts of which are double-hung sash, each window having twelve lights.

76. Cornice and Roof.—The cornice is shown in the section as well as in the elevation, and is indicated to be of wood. This cornice will be fully detailed, so much attention

need not be given to it here, but enough is shown on the drawing to permit the contractor to make his estimate. At the edge of the roof is shown a gutter built into the cornice. This may be of copper, or of wood lined with copper, or it may be formed of galvanized iron. Goosenecks, connecting the gutter with the conductors are shown at the corners of the building. They are more clearly seen on the Side Elevation. Each gooseneck terminates in an ornamental head at the top of the conductor, and ornamental bands secure the conductor to the building.

A hipped roof is shown over the entire building and it is covered with slate. There is a break in the roof about 6 feet above the eaves, which gives the roof a somewhat bell-shaped appearance. Two dormer windows are shown, with roofs similar to the main roof, and side views of similar dormers are seen at the end of the building.

77. Cupola.—In the center of the ridge is an octagonal cupola, with louvres, or slats, arranged to exhaust the air from the building. This cupola can also be used to hold a bell if required. The ducts shown in the floor plans lead to this cupola, in order that the wind blowing past the cupola may aid the fan in forcing the foul air out of the building. The ridge and the cupola are marked to be made of copper, but may, however, be formed of galvanized iron.

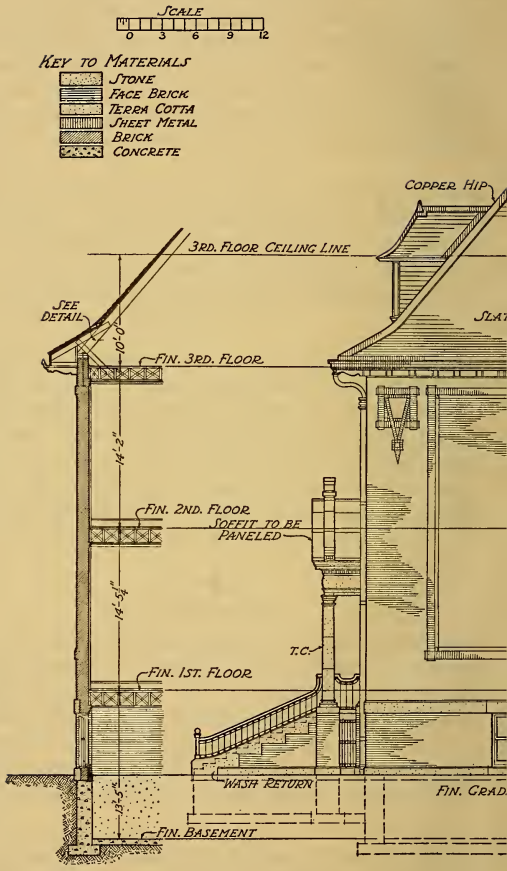
SIDE ELEVATION

78. On the Side Elevation is seen a side view of the front steps and the porch. The design of the railing is indicated rather vaguely, but the scale details which are given later on by the architect should show the design completely. A grille or ornamental iron screen is shown under the porch.

The canopy over the porch is here shown. The footings and foundation walls also are indicated and the depth to which they extend.

79. The outside of the wall of class rooms No. 2 and No. 4 is shown paneled. This effect is obtained by projecting

SIDE - ELEVATION




COMPOSITION ROOF FOR DECK
COPPER RIDGE & CUPOLA
SLATE
STONE
CONDUCTOR
METAL CHAIN

94210

slightly a border of stretchers and one of headers as shown. Small blocks of stone are indicated at the corners. Ornamental panels are also shown at each side of the large panel. These are formed by projecting bands of brick and pieces of stone or colored tile.

80. An elevation of the rear wing is shown on the right side of this elevation. It contains a window to the boiler room and windows to the wardrobes of two of the class rooms.

The chimney, which is shown projecting above the roof, is carried above the top of the roof so as to assure a proper draft. Back of the chimney where it leaves the roof is shown a cricket, which directs snow and rain past the chimney. The cricket is covered with sheet metal and is flashed up underneath the slate.

The remaining indications will be clear. They should, however, be studied in connection with the plans until all the indications are thoroughly understood.

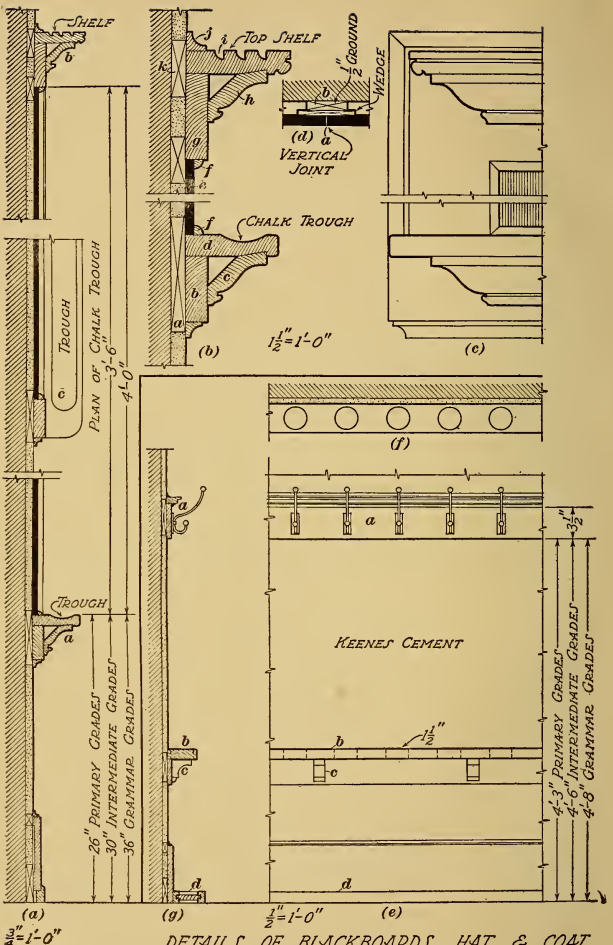
81. At the left of the elevation is given a section to show the story heights and the general construction of the paneled wall.

INTERIOR DETAILS

82. Blackboards and wardrobes are special features of schoolhouses, therefore a sheet of details showing how such fittings are made is given in Fig. 12. It will be seen that the manner of representation is similar to that employed in the drawings that have already been discussed.

83. Detail of a Blackboard.—In Fig. 12 are shown the details of the blackboards of the school building that has been described. The blackboard proper, on which the writing is done, consists of slabs of slate held in a wooden frame in the manner shown.

In (*a*) is shown a section taken vertically through the wall of the class room to which the blackboard is attached. At *a* is a section through the chalk trough or chalk rail, at *b* a section



DETAILS OF BLACKBOARDS, HAT & COAT RACKS, UMBRELLA RACKS & FLOOR TROUGH

FIG. 12

through the cap rail, at *c* a horizontal section through the slate, showing the enclosing frame, and the plan of the chalk trough.

These sections are shown at a much larger scale in (*b*). At *a* are shown grounds, or strips of wood, that are attached to the brick wall. These grounds are spiked to the brick wall and must be made true and secure. To the grounds, the finished wood frame is fastened. The bottom rail on which the slate is supported consists of three strips of molded wood *b*, *c*, and *d*. The strip *d* forms a chalk trough which has a depression in its top surface to contain pieces of chalk.

The slate *e* is placed against the grounds *a* and a molding *f* is nailed to *d* to hold the slate in place. The slate is secured in a similar manner at the top. The strip *g* supports a shelf *i* with a molding *h* under it. The shelf is grooved to prevent drawings or other objects from slipping off it. The molding *j* closes the joint where the shelf meets the wall. The ground *k* affords good nailing for this shelf.

In (*c*) is shown an elevation of one end of the blackboard and its frame showing how it can be finished off in a satisfactory manner.

As the slabs of slate are short, it is necessary to use two or more sheets to form a long blackboard. The sheets are butted together as illustrated in (*d*). Where the sheets come together they are generally rubbed down so that the adjoining surfaces are flush, as at *a*. At such joints, the grounds *b* are made ½ inch in thickness and the plates are adjusted by wedges which are then nailed in place.

84. Details of Wardrobe.—At the bottom of the sheet in Fig. 12 are shown the details of the fittings of a wardrobe such as is attached to each class room. In (*e*) is an elevation of a portion of the wardrobe. In (*f*) is a plan of the umbrella holder, and in (*g*) is a section through the wall of the wardrobe room showing the relation of the various fittings.

In (*e*) at the floor is a trough to take the water that drips from umbrellas. A section through this trough is shown at *d* in (*g*). The umbrellas are held erect by holes in the

shelf *b*. A plan of these holes is shown in (*f*). The shelf is supported by the brackets *c* in (*e*) and (*g*). At *a* in (*e*), and (*g*) is a hat rack with hat hooks. The walls behind these fixtures should be of very hard plaster, such as Keene's cement, and should also be painted with oil paint.

Rubbers may be placed on top of the trough at the floor.

85. Section Through Front Wall.—In Fig. 13 is a detail showing a section taken through the front wall of the schoolhouse. The section is taken through the window of the class room and shows at a larger scale what was shown on the section that appeared on the same sheet as the Front Elevation.

In the upper part of Fig. 13 is a section through the main cornice of the building, showing the construction of the roof and the upper part of the wall. At *a* is a 2″×10″ rafter of yellow pine. The indications show that these rafters are spaced 20 inches, center to center. The foot of the rafter rests on the plate *b*, which consists of two 2-inch planks that are bolted to the wall.

A brace *c* anchors the foot of the rafter to the floor beams.

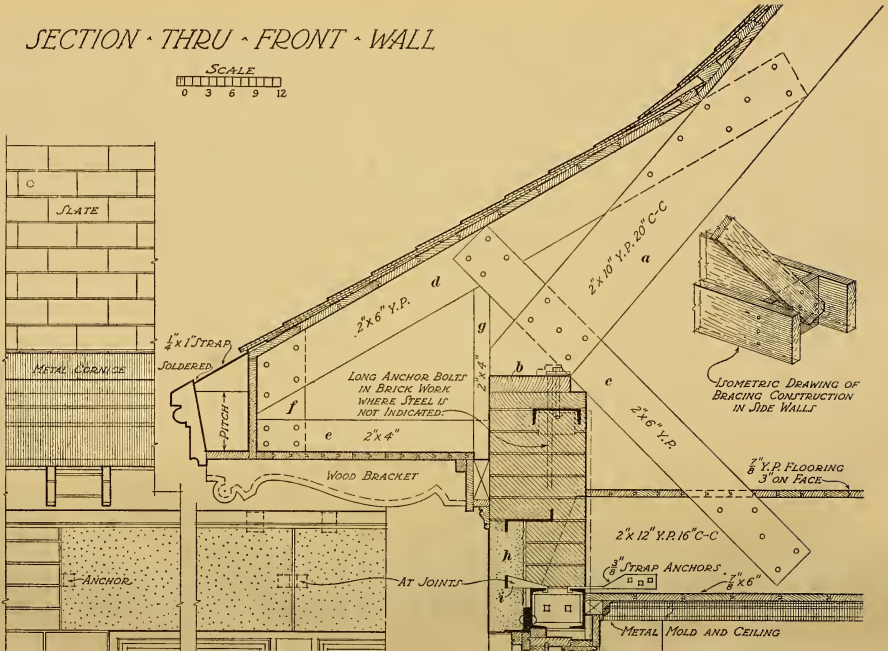
The cornice is framed by the lookouts *d* and *e*, which are joined by the piece *f*. The lookout *e* is spiked to the side of the piece *g*, which is in turn spiked to the wall. Upon this rough framing the cornice is secured. Matched boarding is nailed on top of *d* to hold the slate, and to the under side of *e* to form a soffit to which the wood brackets are nailed. A metal gutter is secured to the front of this construction and is molded so as to form a cornice.

In the elevation to the left of this section is shown an indication of the sheet-metal gutter and a front elevation of one of the wood brackets.

86. The floor construction of the third, or attic, floor is indicated. The joists are 2″×12″, spaced 16 inches center to center, and of yellow pine. The ends bear upon a steel girder, which is composed of two channels. These ends are shown splayed, having what is known as a fire cut, which in case of fire permits the beam to fall out without destroying

SECTION · THRU · FRONT · WALL

SCALE
0 3 6 9 12



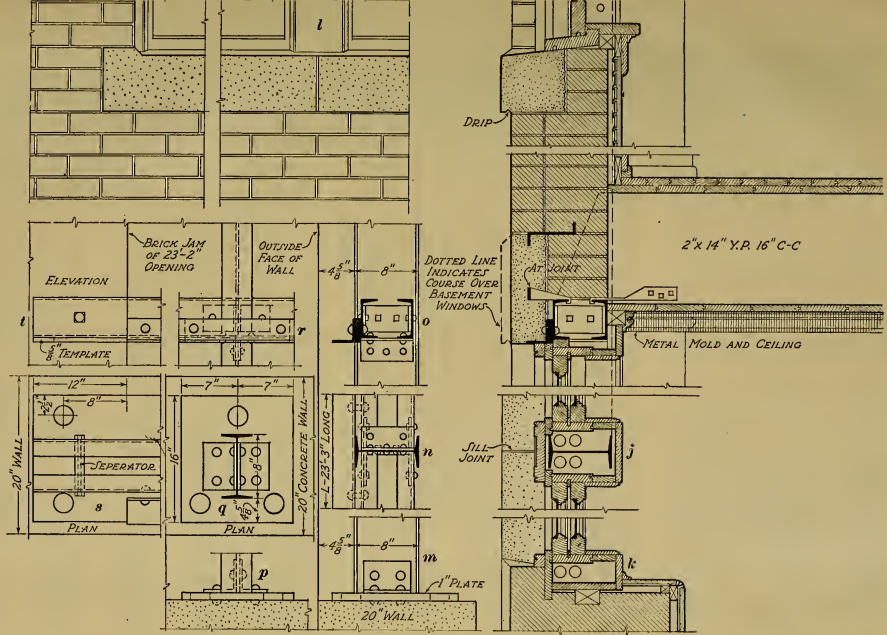

l
Brick Jam of 23"-2" Opening
Outside Face of Wall
Elevation
t
r
5/8" Template
12"
6"
2 1/2"
7"
7"
20" Wall
Seperator
8"
16"
20" Concrete Wall
s
q
Plan
Plan
4 3/8"
8"
o
Dotted Line Indicates Course Over Basement Windows
L 23"-3" Long
n
4 3/8"
8"
m
1" Plate
20" Wall
p
Drip
2"x 14" Y.P. 16" C-C
At Joint
Metal Mold and Ceiling
Sill
Joint
j
k

Fig. 13

the wall. A strap anchor which holds the end of the beam to the girder is also shown. One of these anchors is attached to every second or third floor joist, and helps to tie the construction together. A single floor is shown on top of these joists, and a board ceiling covered with a metal ceiling on the under side. A stone lintel *h* is shown resting upon an angle iron that is riveted to the steel lintel and to the columns. The lintel is anchored at the top and at the ends of the stones as shown at *i*. Below the steel lintel is a section through a double-hung window.

87. The construction of the second floor is similar to that of the attic floor, with the exception that two thicknesses of flooring are shown.

At *j* is a plan of a mullion which occurs between the class-room windows. An I beam which supports the weight of the floors and the masonry between the head of the window and sills of the one above, is shown encased in a wooden box which also contains the weights for balancing the sash.

At *k* is a section through the jamb of a class-room window, the elements of which have been already described.

At the left of the sheet is an elevation of part of a window; also part of a mullion *l*.

88. In the lower left-hand corner of the sheet is a detail of the ironwork construction which is used to form the large window openings of the class rooms.

At *m* is an elevation of the base of one of the I-beam columns, which extend up through the mullions of the window groups in the class rooms.

At *n* is a plan of the I-beam column. At *o* is a section through a lintel over the window, as shown in the section through the wall.

At *p* is a view of the base of the I-beam column viewed from the front, at *g* is a plan of the same and at *r* is a front view of part of the lintel shown in *o*.

At *s* is a plan of the lintel as it rests on the wall at the side of the window group, and at *t* is an elevation of the same as viewed from the front.